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ONTARIO GEOLOGICAL SURVEY

Open File Report 6013

Kimberlite, Base Metal, Gold and Carbonatite Exploration Targets, Derived From Overburden Heavy Mineral Data, Killala Lake Area, Northwestern Ontario

by

T.F. Morris, R.P. Sage, D.C. Crabtree and S.A. Pitre

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Kimberlite, base metal, gold and carbonatite exploration targets, derived from overburden heavy mineral data, Killala Lake area, northwestern Ontario; by T.F. Morris. This release consists of data related to kimberlite indicator minerals, metamorphic or magmatic massive sulphide indicator minerals, gold grains and carbonatite indicator minerals from modern alluvium and till samples collected in an area between Terrace Bay and Marathon, Northwestern Ontario. This data release consists of 19 sets of data stored as both ASCII (.txt) and Microsoft Excel (.xls) files. Data sets are divided into overburden and bedrock related files. Similar files include: 1) definitions of abbreviations in each of the data files (Intro); 2) sample site locations (Appendix A-1); 3) sample processing data (Appendix A-3, B-2, B-3); 4) detailed gold grain summary(Appendix A-4, B-4); 5) kimberlite indicator minerals (Appendix A-5, B-5); 6) kimberlite indicator picking remarks (Appendix A-6, B-6); 7) metamorphic or magmatic massive sulphide indicator minerals (Appendix A-7, B-7); 8) heavy mineral assemblage remarks (Appendix A-8, B-8); and 9) summary of microprobe data (Appendix A-9, B-9). There is 1 additional overburden file (pebble data summary, Appendix A-2) and 1 additional bedrock file (rock sample description, Appendix B-1).These files are on PKZIP compressed format on one 3.5 inch MS-DOS diskette. PKUNZIP and instructions are included.

This diskette is available separately from the report.

ABSTRACT

This report provides data and preliminary interpretations on the types and distribution of kimberlite heavy mineral indicators (KIMs), metamorphic or magmatic massive sulphide indicator minerals (MMSIMs), gold grains and carbonatite indicator minerals from modern alluvium and till samples collected in the Killala Lake area, northwestern Ontario. This data can be used to focus exploration efforts for kimberlite (diamonds), base metal, gold and carbonatite (rare earth) deposits. A total of 230 modern alluvium and 82 till samples were collected from across the study area.

In addition to the modern alluvium and till samples, 8 bedrock samples were collected and processed to characterize their heavy mineral composition. Orientation surveys were completed over the Prairie Lake Carbonatite, Major General Resources Ltd.'s Spider Lake base metal deposit and Cameco Gold Inc.'s Empress Hill gold deposit. These surveys defined overburden heavy mineral signatures associated with each deposit type. Bedrock and overburden data obtained from the orientation surveys were used to help interpret heavy mineral signatures derived from the regional overburden sampling program.

From the overburden samples, 5 "G10" Cr-pyrope garnets, one Type I eclogite garnet and one "inclusion field" chromite were recovered. The recovery of these grains is significant, as they are rare and commonly associated with diamond-bearing kimberlite. Seven areas and 6 individual sites were identified as potential sites for further kimberlite exploration.

A number of metamorphic or magmatic massive sulphide indicators were recovered, including 10 gahnite grains. Gahnite is rare and is considered an excellent indicator of potential metamorphic or magmatic massive sulphide mineralization. Based on this data, 2 areas and 3 individual sites are recommended for further base metal exploration.

Very few gold grains were recovered, however, 5 sites did have pristine gold grains associated with them. This is significant as pristine gold grains suggest close proximity to source.

A number of carbonatite indicator minerals were recovered including andradite, barite, synchysite, bastnaesitite, Nb-perovskite and pyrochlore. The recovery of these grains is significant as a similar assemblage is associated with the Molycorp Mountain Pass Carbonatite (northern California) that has supplied much of the world's rare earths since the early 1950s. Two areas and 1 individual site are recommended for further exploration.

INTRODUCTION

Project History and Purpose

Since 1993, the Ontario Geological Survey (OGS) has conducted a series of Quaternary mapping and overburden sampling programs to assess the diamond potential of the Kapuskasing Structural Zone (KSZ)(Figure 1). Kimberlite is recognized as the primary host rock for diamond. A suite of heavy minerals (Cr-pyrope garnet, chromite, Mg-rich ilmenite, Cr-diopside and forsteritic olivine) are commonly associated with kimberlite and are referred to as kimberlite indicator minerals (KIMs). The types and distribution of KIMs recovered from these programs clearly demonstrate that the KSZ has excellent potential for hosting diamond-bearing kimberlite (Morris et al.1994; Morris et al. 1997; Morris et al. 1998; Morris et al. 1998; Morris 1999a; Stephenson et al. 1999). To date, 2 occurrences of diamond-bearing rock and kimberlite have been discovered in the Wawa area (KWG Resources Inc./Spider Resources Inc., Press Release, 20/08/97; Canabrava Diamond Corporation, Press Release, 09/12/97; Band-Ore Resources Ltd., Press Release 10/02/00; Pele Mountain Resources Inc., Press Release, 10/02/00).

Following the success of the KSZ Quaternary mapping and overburden sampling programs, plans to assess similar structures in other parts of Ontario were made. One such area, the Trans-Superior Tectonic Zone (TSTZ), extends from Michigan north-northeast into Ontario, west of Marathon (Figure 1). Kimberlites straddle the structure within Michigan (Cannon and Mudrey 1981) and ultramafic lamprophyres, which may belong to the kimberlite "clan" (Rock 1990), are recognized in association with the TSTZ within Ontario (Sage 1993). The TSTZ represents a fault system that has accommodated emplacement of mantle material (Sage 1999). To evaluate the kimberlite potential of the TSTZ in Ontario, an area between the towns of Marathon and Terrace Bay was chosen for Quaternary mapping and stream sediment and till sampling. Collected overburden samples were processed to determine KIM signatures (Morris 1999b).

In addition to KIMs, overburden samples were processed for metamorphic or magmatic massive sulphide indicator minerals (MMSIM®), gold grains and carbonatite indicator minerals. The MMSIMs are associated with 3 main types of base metal deposits: 1) volcanosedimentary massive sulphides in high grade regional metamorphic terrain; 2) skarn and greisen deposits; and 3) magmatic Ni-Cu sulphides (Averill 1999). The composition of gahnite, a rare and important MMSIM associated with metamorphosed volcanosedimentary massive sulphide deposits, can also be used to indicate the presence of rare-element pegmatite (Morris et al. 1997). The presence and distribution of MMSIMs and gold grains recovered from overburden sampling programs completed over the KSZ defined several important base metal, rare-element pegmatite and gold exploration targets (Morris et al. 1994; Morris et al. 1997; Morris et al. 1998; Morris et al. 1998; Morris 1999a; Stephenson et al. 1999).

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From the current project, 230 modern alluvium and 82 till samples were collected and submitted for heavy mineral processing. In addition, 8 bedrock samples were collected to establish baseline data on the composition of specific, local bedrock types thought critical to the understanding of heavy mineral signatures derived from the modern alluvium and till samples.

This report summarizes the types, concentrations and distribution of KIMs, MMSIMs, gold grains and carbonatite related heavy minerals recovered from the different surficial and bedrock materials. Recommendations for kimberlite, base metal and carbonatite exploration are proposed. The data is summarized in digital format (Morris 2000) and therein is presented in 2 parts: a) overburden (Appendix A1-A9; and b) bedrock (Appendix B1-B9). The data consists of the following ASCII (.txt) and Microsoft Excel (.xls) files:

INTRO	Definitions of abbreviations
OVERBURDEN	
Appendix A-1	Sample Site Locations (includes bedrock sample locations)
Appendix A-2	Pebble Data Summary
Appendix A-3	Sample Processing Data
Appendix A-4	Detailed Gold Grain Summary
Appendix A-5	Kimberlite Indicator Minerals
Appendix A-6	Kimberlite Indicator Mineral Picking Remarks
Appendix A-7	Metamorphic or Magmatic Massive Sulphide Indicator Minerals
Appendix A-8	Heavy Mineral Assemblages
Appendix A-9	Summary of Microprobe Data
BEDROCK	
Appendix B-1	Rock Sample Description
Appendix B-2	Processing Data
Appendix B-3	Table Concentrate Data
Appendix B-4	Detailed Gold Grain Summary
Appendix B-5	Kimberlite Indicator Minerals
Appendix B-6	Kimberlite Indicator Mineral Picking Remarks
Appendix B-7	Metamorphic or Magmatic Massive Sulphide Indicator Minerals
Appendix B-8	Heavy Mineral Assemblage Remarks
Appendix B-9	Summary of Microprobe Data

Study Location

The Killala Lake-Coldwell area is located between the towns of Marathon and Terrace Bay in northwestern Ontario (Figure 1). The study area is represented on 2, 1:50 000 scale National Topographic Series maps; the northern part on the Killala Lake (42 E/2) sheet and the southern part on the Coldwell (42 D/15) sheet. The area is bounded by longitudes 86°30'W and 87°00'W and latitudes 49°00'N and 49°15'N.

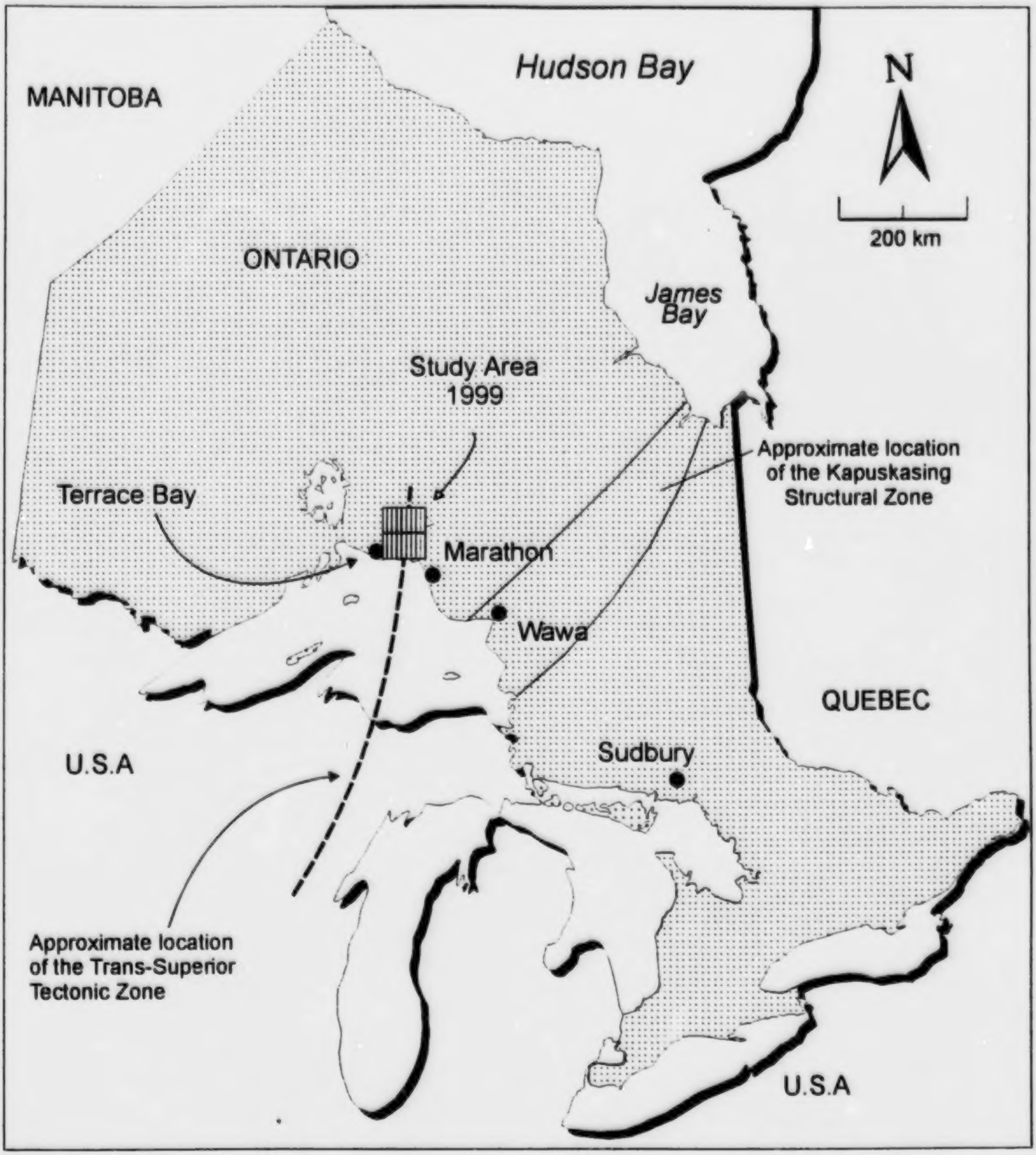

Hudson Bay
MANITOBA
N
200 km
ONTARIO
James Bay
Study Area 1999
Approximate location of the Kapuskasing Structural Zone
Terrace Bay
Marathon
Wawa
QUEBEC
U.S.A
Sudbury
Approximate location of the Trans-Superior Tectonic Zone
U.S.A

Figure 1. Location of study area relative to the Trans-Superior Tectonic Zone.

Physiography

The study area is located south of the Great Lakes-Hudson Bay drainage divide and all surface drainage flows south into Lake Superior. There are 4 major drainage basins within the area. Flow from these basins is through the Steel, Prairie, and Little Pic rivers and Deadhorse Creek.

Much of the area lies within the Abitibi Uplands subregion of the James physiographic region (Bostock 1976). This subregion is underlain by crystalline Archean rocks and has a broad rolling surface that rises gently from the Hudson Bay Lowland. Along the shoreline of Lake Superior, however, the study area falls within the Port Arthur Hills subregion of the James physiographic region (Bostock 1976). This subregion consists of more rugged topography with relief in excess of 150 m (Gartner 1979a).

REGIONAL GEOLOGY

Bedrock Geology

The bedrock geology of the study area is complex, straddling the Quetico and Wawa subprovinces of the Canadian Shield (Mason 1981a-e; Ontario Geological Survey 1991)(Figure 2). Within this area, the subprovinces are separated by the Killala Lake deformation zone which is several kilometers wide (Williams 1989). Both subprovinces consist of Neo-Mesoarchean (2.5 to 3.4 Ga) intrusive and supracrustal rocks. These rocks are crosscut by intrusive rocks of Paleoproterozoic (1.6 to 2.5 Ga) and Mesoproterozoic age (0.9 to 1.6 Ga).

Neo-Mesoarchean intrusive rocks of the Quetico subprovince consist of a gneissic tonalite suite and the supracrustal rocks consist of a metasedimentary suite. Neo-Mesoarchean intrusive rocks of the Wawa subprovince include the gneissic tonalite suite of the Quetico subprovince, a massive granodiorite to granite suite, a diorite-monzonite-granodiorite suite and mafic and ultramafic rocks. Supracrustal rocks of the same age include the metasedimentary suite described for the Quetico subprovince, migmatized supracrustal rocks, felsic to intermediate metavolcanic rocks and mafic to intermediate metavolcanic rocks. The Marathon dike swarm cuts through the study area. These dikes strike northeasterly and were emplaced around 2.17 Ga (Osmani 1991).

The TSTZ is a prominent structural feature that extends north-northeast through the Killala Lake-Coldwell area (Sage and Watkinson 1995). A major alkalic event associated with the TSTZ occurred between 1.0 to 1.2 Ga (Sage 1991). During this time, several diatreme structures (Sage 1982), the Prairie Lake carbonatite complex (Sage 1987), the Killala Lake alkalic complex (Sage 1988) and the Coldwell alkalic complex were emplaced (Sage 1993). The TSTZ extends south into Michigan where kimberlites straddle the southwest extension of this structure (Cannon and Mudrey 1981).

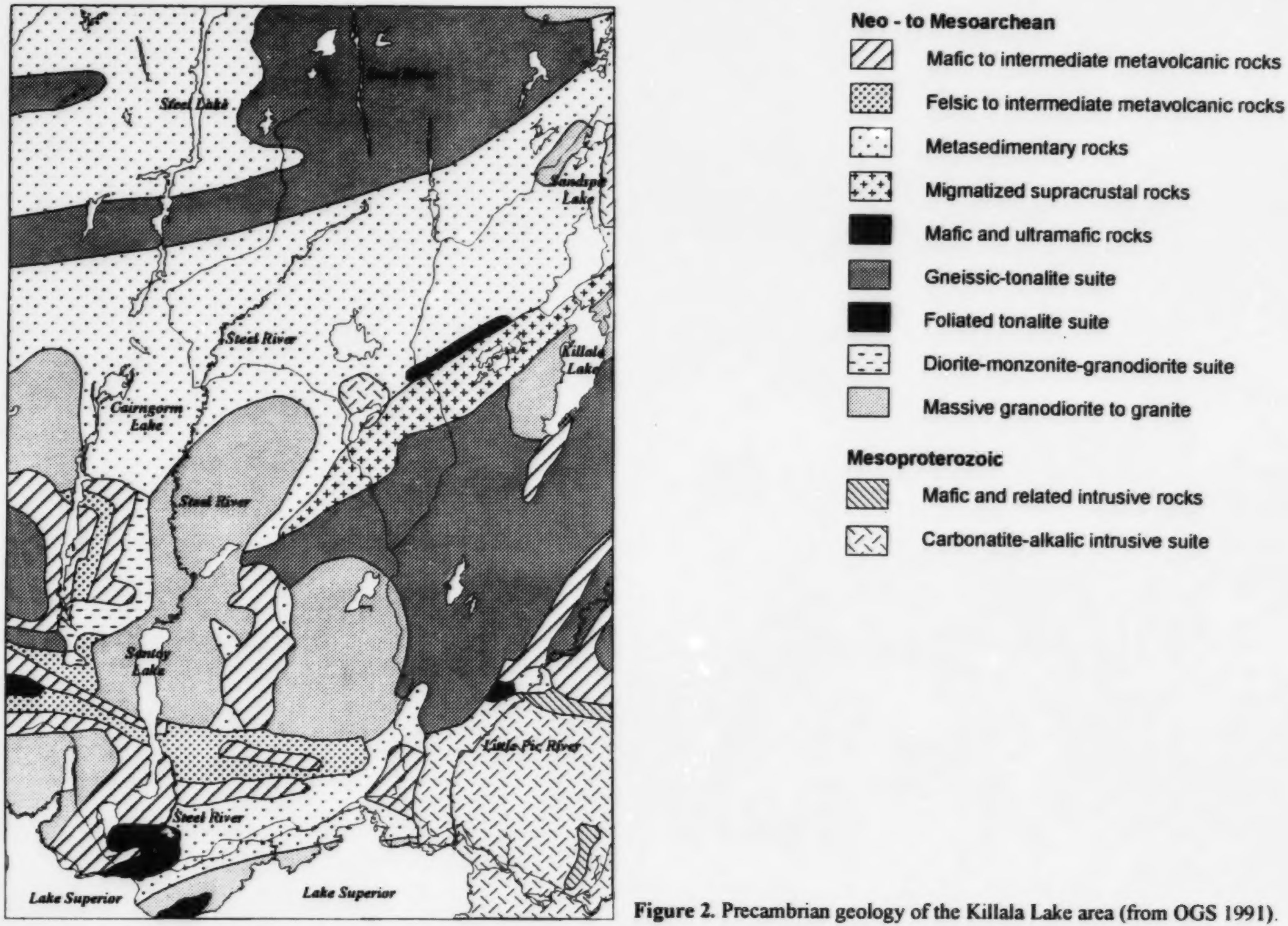

Steel Lake
Steel River
Sandspit Lake
Killala Lake
Cairngorm Lake
Steel River
Santoy Lake
Steel River
Little Pic River
Lake Superior
Lake Superior
Neo - to Mesoarchean
Mafic to intermediate metavolcanic rocks
Felsic to intermediate metavolcanic rocks
Metasedimentary rocks
Migmatized supracrustal rocks
Mafic and ultramafic rocks
Gneissic-tonalite suite
Foliated tonalite suite
Diorite-monzonite-granodiorite suite
Massive granodiorite to granite
Mesoproterozoic
Mafic and related intrusive rocks
Carbonatite-alkalic intrusive suite

Figure 2. Precambrian geology of the Killala Lake area (from OGS 1991).

Overburden Geology

All glacial landforms and materials within the study area were deposited during the Wisconsinan glaciation. Mapping of Quaternary materials has been completed at scales of 1:1 000 000 (Barnett et al. 1991), 1:506 880 (Zoltai 1965) and 1:100 000 (Gartner 1979a, 1979b). Specific studies or observations on local Quaternary features and landforms were completed by Geddes et al. (1987), Phillips (1974, 1980), Zoltai (1967), and Zoltai and Herrington (1966).

Direction of ice flow across the area is defined by the orientation of glacial striae, grooves and chattermarks. Drumlinoid forms in the northeast and drumlins in the north-central parts of the area are aligned in the direction of regional ice flow. Two sets of striae orientated at 220° and 170-190° respectively, were observed. At one site, the 170-190° set crosscuts the 220° set. The oldest set (220°) was observed throughout the study area and represents an earlier, regional ice flow. The younger set (170-190°) was observed only in the southern part of the area and represents later ice flow controlled by bedrock topography as ice thinned during retreat. A subglacial till (<1 m thick) covers most of the study area. The clasts within the till reflect local bedrock lithologies and the matrix does not react with 10% HCl.

Landforms and materials associated with ice retreat are located primarily within bedrock controlled valleys. Ice-contact stratified drift is associated with recessional moraines, dead ice topography and eskers. Within recessional moraine and dead-ice topography, flow till and poorly-sorted sand containing a variety of clast types (from local material to Paleozoic clasts derived from the Hudson Bay Lowland) were observed. The matrix of this material reacts strongly with 10% HCl indicating the presence of carbonate within the till matrix. The carbonate is most likely derived from Paleozoic bedrock associated with the Hudson Bay Lowlands.

Broad outwash plains composed of coarse-grained glaciofluvial materials were observed within the northern part of all major river valleys. Occasionally, glaciofluvial channels, terminating at the margins of former glacial and post-glacial lakes, were observed. Coarse- and fine-grained glaciolacustrine materials are confined to the major river valleys. A series of former glacial and post-glacial lake levels, the elevations of which are defined by Farrand (1960), were recognized within the study area. The elevation of each of these lake levels is defined by terrace surfaces, beach ridges and wave-cut benches. Post-glacial features such as sand dunes, colluvium and modern shoreline features (such as bars and spits) were also observed.

METHODS

Material Sampling

Modern alluvium and subglacial till were sampled. In total, 230 modern alluvium and 82 till samples were collected and submitted for heavy mineral analysis. In addition, 8 bedrock samples were taken to establish baseline heavy mineral data. Bedrock types included: 2 lamprophyres; 1 gabbro; 1 sericite schist (from the Cameco Gold Inc., Empress Hill gold property); a mineralized felsic metavolcanic rock (from the Major General Resources Ltd., Spider Lake base metal property); a nepheline syenite sample from the Killala Lake area; and 2 quartz-bearing diorite samples with carbonate veins collected from south of the Prairie Lake Carbonatite. In addition to these samples, access was granted to heavy mineral data obtained from rock samples collected from the Prairie Lake Carbonatite (Sage et al. in prep.).

Sample numbers, sample types and locations (by UTM coordinates) are summarized in Appendix A (this report) and in Morris (2000, Appendix A-1). Classification and description of each bedrock sample is summarized in Morris (2000, Appendix B-1).

Modern alluvium was chosen as the primary sampling media as it is commonly used as a means of gaining a fast, relatively inexpensive heavy mineral signature for individual drainage basins. The heavy mineral signature obtained from modern alluvium is a product of the erosion of both bedrock and overburden, and the subsequent transportation and deposition of the eroded material. A more detailed discussion of the controls of these processes can be found in Morris (1995), Morris and Kaszycki (1997) and Morris et al. (1994). It is important to note, however, that lakes within drainage basins act as sediment traps, restricting the down drainage transport of heavy minerals. Therefore, when modern alluvium sites were chosen for this study, an attempt was made to maximize the length of stream section between the sample site and a lake. This maximizes the area of drainage basin sampled by the stream.

To maintain continuity with the data collected in 1994 (Morris et al. 1994), 1996 (Morris et al. 1997), 1997 (Morris et al. 1998), and 1998 (Stephenson et al. 1999) the same sampling procedure employed in those programs was used in this sampling program. Modern alluvium was collected from bars or sediment traps, areas within streams where heavy minerals tend to concentrate. Material was sifted through a 7 mm mesh, steel sieve to exclude the coarse fraction. A minimum of 10 kg of less than the 7 mm sized material was collected at each site. At sites where the material was fine-grained, a minimum of 15 kg of less than 7 mm sized material was collected to ensure that a sufficient amount of concentrate was obtained. A sample of the greater than 7 mm sized fraction was collected to determine pebble lithology (Morris 2000, Appendix A-2). Modern alluvium was also panned at each site and the concentrate was stored for future reference.

Till samples consisted of lodgement, or subglacially deposited tills. These tills consist primarily of locally derived materials and are ideal for till sampling programs (Morris and Kaszycki 1997). At each till sample site 3, 200 g sub-samples were collected; one each of humus and till "B" and "C" horizon material. In addition, a 10 kg till "C" horizon sample and a pebble sample were collected. The 10 kg sample was sieved through a 7 mm mesh, steel sieve to exclude the coarse fraction. The 200 g samples of humus and till "B" and "C" horizon material were submitted for instrumental neutron activation analysis (INNA) and inductively coupled plasma (ICP) geochemical analysis.

This data will be released at a later date. The 10 kg till "C" horizon sample was submitted for heavy mineral concentration and subsequent heavy mineral analysis.

Approximately 10 kg of representative bedrock material was collected from 8 bedrock types. One lamprophyre sample was collected from a road cut located along Highway 17 west of the Little Pic River bridge. This lamprophyre was originally discovered by Ashton Mining of Canada Inc. A second lamprophyre sample was recovered from a dike located east of Sandspit Lake. Gabbro and nepheline syenite samples were recovered from the west side of the Killala Lake alkalic complex near Sandspit Lake. A sericite schist sample was collected from the Cameco Gold Inc. gold property in the Empress Hill area, east of Terrace Bay. One felsic metavolcanic rock sample was recovered from an exploration trench on the Spider Lake base metal property of Major General Resources Ltd. Finally, quartz-bearing diorite samples were collected south of the Prairie Lake Carbonatite. These were sampled in response to an anomalous carbonatite heavy mineral signature in a modern alluvium sample collected at this location.

Observations made at each sample site included both a site description (sample site material type, surrounding material type, presence of bedrock or boulders, topography, channel surface slope, stream flow, drainage of surrounding area and vegetation) and a material description (texture, abundance, size, shape, surface features, types of pebbles and bar form). A more detailed explanation of the types of observations made are reported in Morris and Kaszycki (1997).

Sampling Strategies

Orientation Surveys

Three orientation surveys were completed over different bedrock lithologies. The purpose of these surveys were to: a) determine the lithologic, heavy mineral and geochemical signature of overburden material over the different bedrock lithologies; and b) characterize the scale and form of glacial dispersal associated with various bedrock lithologies. Both till and modern alluvium samples were collected over the Prairie Lake Carbonatite, the Cameco Gold Inc. gold property at Empress Hill and the Major General Resources Ltd. base metal property at Spider Lake. In this report, only the lithologic and heavy mineral characteristics of overburden associated with each bedrock type will be considered. Samples associated with these orientation surveys are excluded from the regional data base.

Regional Surveys

Regional surveys provide data on the types, distribution and relative concentration of heavy minerals in a given region. The focus of the 1999 sampling program was to provide regional information on KIMs, MMSIMs, gold and carbonatite heavy minerals. The number of modern alluvium regional samples that were collected was predetermined by budget considerations. Samples were collected over as broad an area as possible. For till sampling, a hypothetical 5 km^2 grid was placed over the study area and as many of the grid squares as possible were sampled.

Pebble Lithology

Pebble lithology was determined by comparing the physical properties of pebbles to representative samples of local bedrock. Pebble lithologies identified include: granite, gneiss: metasedimentary; sandstone; mafic metavolcanic; felsic metavolcanic; felsic intrusive; carbonate; carbonatite; quartz; mafic intrusive; diatreme; ironstone; other and unknown.

Heavy Mineral Recovery and Identification

All samples were sent to Overburden Drilling Management Ltd. in Nepean, Ontario for processing to isolate KIMs, MMSIMs, gold grains and carbonatite heavy minerals. This procedure is discussed in detail elsewhere and will not be repeated here (Morris and Kaszycki 1997). Composition of critical indicator minerals was determined through microprobe analysis. Sample processing data for the overburden materials are summarized in Morris (2000) Appendix A-3 and for the bedrock samples in Appendix B-2 and B-3.

A detailed gold grain summary is provided in Morris (2000) Appendix A-4 for overburden samples and Appendix B-4 for bedrock samples. The physical appearance of each gold grain was evaluated and classified as being pristine, modified or reshaped. Due to gold's malleability, grain shape is transformed during transport by glacial ice (DiLabio 1990). Therefore, a reshaped grain is more likely to have been transported a greater distance from its source than a pristine one.

During processing, 6 types of KIMs are recovered: Cr-pyrope garnet; Cr-poor megacrystic pyrope garnet, eclogitic pyrope-almandine garnet; Cr-diopside; Mg-rich ilmenite; and chromite. Forsteritic olivine, a mineral commonly associated with kimberlite was also picked, when observed, in the heavy mineral concentrate (Morris 2000, Appendix A-5, A-6, B-5, B-6).

Processing also recovered several types of MMSIMs. Types of MMSIMs and associated bedrock type are summarized in Table 1. MMSIM species recovered from overburden and bedrock samples are summarized in Morris (2000) Appendix A-7 and B-7. In addition to the MMSIMs, each sample's heavy mineral assemblage was described by Overburden Drilling Management Limited staff (Morris 2000, Appendix A-8, B-8).

Potential KIM grains were sent to the Ontario Geoscience Laboratories (OGL) for microprobe analysis to determine precise grain composition (Morris 2000, Appendix A-9, B-9). The only MMSIM probed was gahnite (Morris 2000, Appendix A-9). The calibration routine and operating conditions for the microprobe are summarized in Morris et al. (1994) and Morris et al. (1997). Prior to mounting and polishing the grains for

Mineral	MVMS	Skarn	Greisen	Mag Ni-Cu
Anthophylite	X			
Barite	X			
Cassiterite			X	
Chromite				X
Cinnibar	X			
Corundum	X			
Cr-rutile	X			X
Dumortierite	X			
Fluorite			X	
Forsterite Olivine		X		
Franklinite	X			
Gahnite	X			
Grossular		X		
Hercynite				X
Johannsenite		X		
Knebelite Olivine		X		
Kyanite	X			
Loellingite	X			X
Low Cr-diopside				X
Mg-spinel	X			
Mn-epidote	X			
Native Gold	X	X		
Olivine				X
Orthopyroxene	X			X
PGE Alloys				X
Rammelsbergite				X
Sappherine	X			
Scheelite		X		
Sillimanite	X			
Sperrylite				X
Spessartine	X			
Staurolite	X			
Topaz			X	
Tourmaline	X		X	
Uvarovite				X
Vesuvianite		X		
Willemite	X			
Wolframite			X	

MVMS: Metamorphosed volcanosedimentary massive sulphide deposit

Mag Ni-Cu: Magmatic nickel copper massive sulphide deposit

X: Presence or mineral commonly associated with deposit

Table 1. Summary of heavy minerals commonly associated with specific types of base metal deposits (from Averill 1999). Other minerals considered as indicators of base metal mineralization, and common to all 4 types of base metal deposits considered here include: chalcopyrite, galena, molybdenite, pyrite and sphalerite.

microprobe analysis, their shape was recorded by photographing them on a scanning electron microscope.

Kimberlite Indicator Minerals

Garnet

Garnet grains recovered and analyzed from samples collected in this study include Cr-pyrope, pyrope, almandine, andradite and spessartine. Garnets of peridotite origin are typically Cr-rich pyropes. This mineral may originate from many different types of peridotite, but the most important are harzburgite and lherzolite. Eighty-five percent of Cr-pyropes that occur as inclusions in diamond are Ca-depleted, Cr-enriched and harsburgitic in origin (Gurney 1984). These types of garnet have been termed "G10" (Dawson and Stephens 1975). The recovery of "G10" garnets from surficial material is important since it suggests that these minerals originated from harzburgitic peridotite and are more strongly associated with diamonds than are garnets of lherzolitic ("G9") origin (Dawson and Stephens 1975).

Other pyrope garnets associated with kimberlites are the megacrystic suite, which are not directly associated with diamond. These, when found with other KIMs, can also be useful indicators. These minerals range from Cr-poor to moderate levels (2 to 3 wt %) of Cr_2O_3.

The composition of mantle derived eclogitic garnet is complex and overlap may exist between garnets of peridotitic and deep crustal origin (Dawson and Stephens 1975). However, it is possible to differentiate eclogitic garnets from crustal and Cr-poor megacrystic garnets through analysis of the garnet's composition (Schulze 1999). Typically, eclogitic garnets have an FeO content of less than 22 wt %. The MnO wt % values of eclogitic garnets are commonly less than 0.5 wt % whereas crustal garnets have values of over 1 wt %. Also, the wt % Na_2O for garnets derived from diamond-bearing eclogites is greater than 0.07 (Schulze 1999; McCandless and Gurney 1989; Gurney 1984). Like the "G10" Cr-pyrope garnet, eclogites with low FeO and MnO wt % values and high Na_20 wt % values are considered a valuable KIM.

Chromite

Chromites found in diamond inclusions differ from most other chromites by their high Cr_2O_3 content, generally greater than 61 wt % (Gurney 1984). In addition, they also have an MgO content greater than 10 wt % (Fipke et al. 1995). These chromites are termed "inclusion field" chromites since they plot in the diamond inclusion field on a chromite Cr_2O_3-MgO plot. Finding such a chromite in surficial material or a rock sample is just as significant as finding a "G10" Cr-pyrope garnet.

Chromite Cr_2O_3-TiO_2 plots are useful in differentiating chromite unique to lamproites and kimberlites from those that are non-lamproitic or non-kimberlitic in origin (Fipke et al. 1995). Those chromites that plotted in the non-lamproite/ kimberlite field were excluded from the KIM database (Morris 2000, Appendix A-9). Those that plotted in the overlap field and the field unique to kimberlites and lamproites were included in the KIM database (Morris 2000, Appendix A-9).

Mg-ilmenite

Ilmenite found within kimberlite is generally Mg-rich with MgO values that range between 4 and 15 wt % (McCallum and Vos 1993). In this study, such ilmenites recovered from overburden are regarded as useful KIM indicators (Morris 2000, Appendix A-9). A Mg-ilmenite parabolic plot (Cr_2O_3 versus MgO) (Gurney and Moore 1991) can be used to determine if the ilmenite grains originated from a reducing environment (favorable for diamond preservation within the magma) or from an oxidizing environment (conducive to diamond resorption into the magma).

Cr-diopside

Stephens and Dawson (1977) attempted to classify Cr-diopsides as kimberlitic based on cluster analysis. Their analysis suggested that most Cr-diopsides derived from kimberlite consist of Cr_2O_3 wt % values greater than 1.45. These were referred to as high Cr-diopsides, and since then, Cr-diopside has been classified as kimberlitic based on this Cr_2O_3 wt % value (McClenaghan et al. 1993; McClenaghan et al. 1995; McClenaghan et al. 1996). However, clinopyroxenes isolated from kimberlite have a wide range of Cr content. For example, Cr-diopsides isolated from kimberlite in the Kirkland Lake-Cobalt area of northeastern Ontario have Cr_2O_3 wt % values ranging between 0.03 and 3 (Sage 1996). For this reason, others have used a more liberal cut-off value of 0.5 wt % Cr_2O_3 (Thorleifson and Garrett 1993).

Recognizing a need to determine better criteria for defining a source of Cr-diopside, the OGS undertook a study to characterize the composition of Cr-diopside from kimberlite and other bedrock types. By comparing the molecular wt % of Cr_2O_3, Al_2O_3 and Na_2O, the OGS established a template within which Cr-diopsides recovered from kimberlite plot as a separate field (Morris et al. 1999; Morris et al. in prep.). This template defines minimum and maximum Cr_2O_3 molar wt % values of 1 and 40 and minimum and maximum Al_2O_3 molar wt % values of 2 and 50 for kimberlite derived Cr-diopside grains. Na_2O values do not exceed 65 molar wt % for these grains. Between 1 and 20 molar wt % Cr_2O_3, Na_2O values decrease from 48 molar wt % to 29 molar wt %. Above 20 molar wt. % Cr_2O_3, Na_2O molar wt % values increase from 19 to 58. The application of this template to Cr-diopside data obtained from overburden samples is useful in differentiating Cr-diopside derived from a deep mantle source as opposed to a shallow crustal source, and is a far better discriminator of Cr-diopsides derived from kimberlite than from previous methods cited in the literature.

Olivine

Like Cr-diopsides, olivine on its own is not a good KIM. The composition of olivine recovered from kimberlite in Ontario (Sage 1996) was compared against the composition of olivine recovered from rock types within the present study area (Figure 3). Olivine from kimberlite have F_0 values (F_0 = Mg/MgFe) greater than 80 (Figure 3a). Olivine recovered from local gabbros and lamprophyres have F_0 values that plot between 40 and 95 (Figure 3b). Olivine recovered from syenite have F_0 values less than 40 (Figure 3c).

Therefore, olivine with F_0 values greater than 95 were considered to be associated exclusively with kimberlite. Those with F_0 values between 80 and 95 were included within both the mafic and kimberlitic and kimberlite data set. Those olivines with F_0 values greater than 40 but less than 80 were included exclusively in the mafic data sets. Those olivines with an F_0 value of less than 40 were considered to be derived exclusively from syenite.

Metamorphic or Magmatic Massive Sulphide Indicator Minerals

Averill (1999) has defined a suite of minerals useful for identifying metamorphosed volcanosedimentary massive sulphide deposits, skarn, greisen and magmatic Ni-Cu massive sulphide deposits (*see* Table 1). Identifying these minerals in overburden deposits is possible and useful, as they are: coarse-grained; are unique to these types of mineralization; visually distinctive; easy to concentrate due to their specific gravity (> 3.2); amenable to paramagnetic separation; and they are relatively resistant to weathering (Averill 1999). From a practical viewpoint and due to time constraints, the composition of all these grains was not determined. Instead, only the composition of Cr-diopside, chromite, gahnite and olivine were determined.

Cr-diopside

Only those Cr-diposides plotting outside the kimberlite template (as defined in the previous section) were considered as potential MMSIMs (Morris 2000, Appendix A-9). These grains were further subdivided based on their Cr_2O_3 wt % values. Cr-diopside recovered from Ni-Cu massive sulphide deposits in the Thompson Nickel Belt (Manitoba) and Finland consistently have Cr_2O_3 wt % values less than 1.3 (Averill, personal communication, Overburden Drilling Management Limited, 1999). For this reason, Cr-diopsides with less than 1.3 wt % Cr_2O_3 were considered to be MMSIMs. However, when using this criteria caution must be exercised as several Cr-diopside grains derived from the 2 local lamprophyres have Cr_2O_3 wt % values of less than 1.3 (*see* Bedrock Results section). Those with a wt % Cr_2O_3 greater than 1.3 were excluded from the MMSIM data base (Morris 2000, Appendix A-9).

Chromite

Those chromites that plot in the non-lamproitic/kimberlitic field and the overlap field of the Fipke et al. (1995) Cr_2O_3-TiO_2 plot were included in the MMSIM database (Morris 2000, Appendix A-9).

Olivine

Those olivines with an F_0 value between 40 and 95 were classified as a MMSIM. See previous discussion regarding olivine as a KIM.

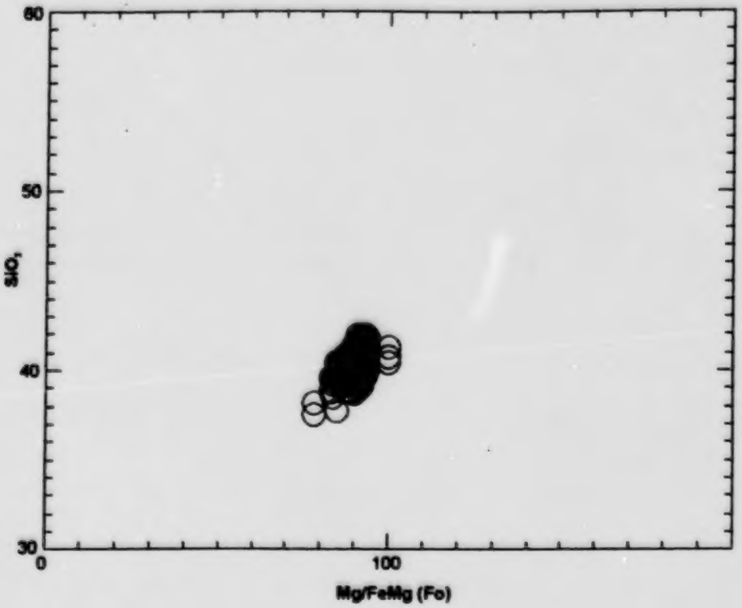


Figure 3a. Binary plot of olivine derived from kimberlite from James Bay (Sage 1996), Kirkland Lake (Sage 1996) and elsewhere (Mitchell 1986).

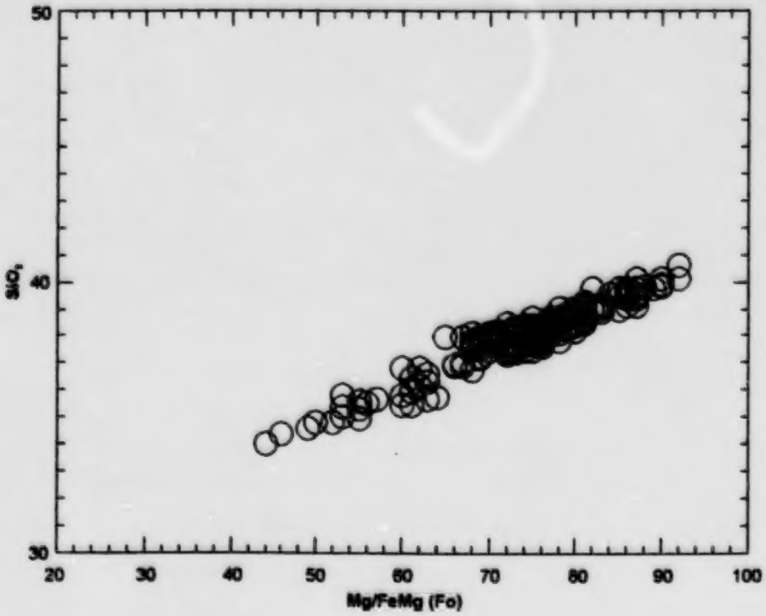


Figure 3b. Binary plot of olivine derived from local gabbro (Shore 1995), monchiquite (Laderoute 1987) and camptonite (Laderoute 1987)

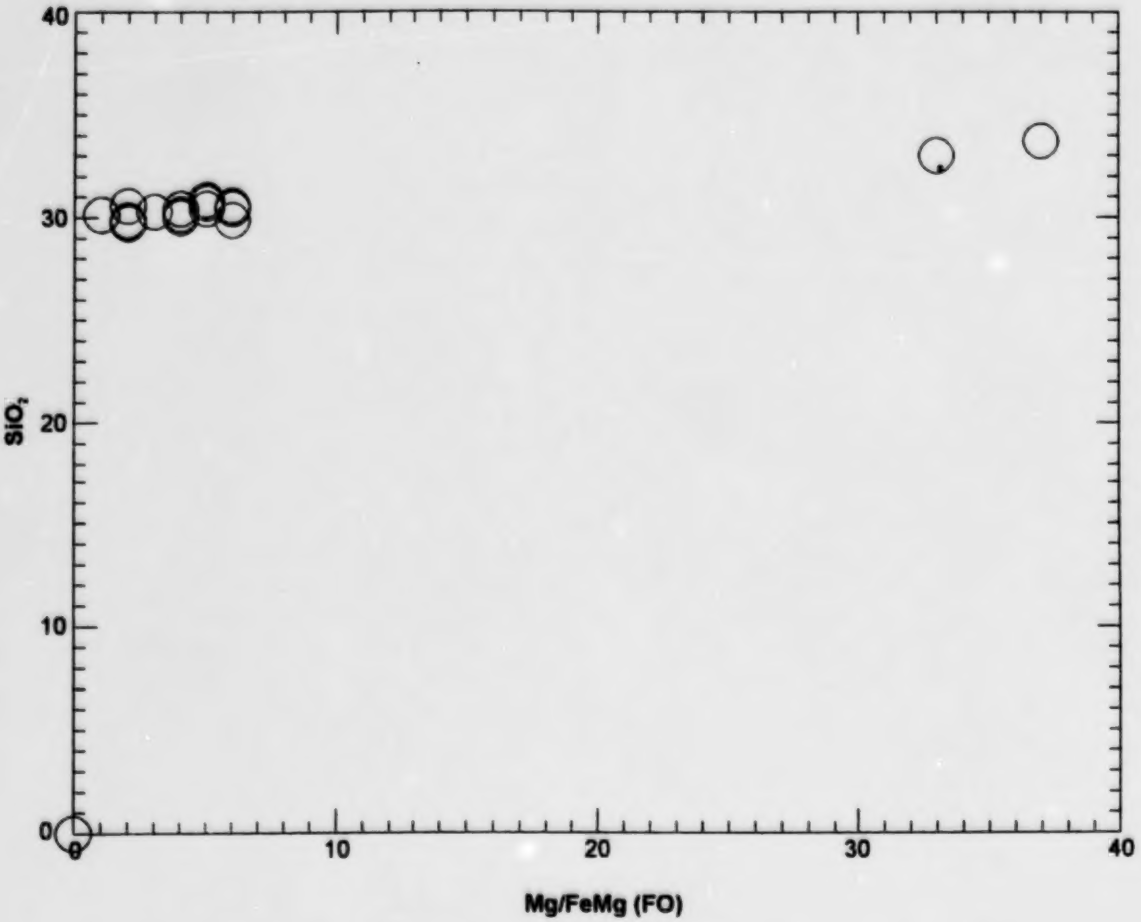


Figure 3c. Binary plots of olivine from local syenite (Whittaker 1976).

Gahnite

Gahnite is a useful indicator mineral in exploration for polymetallic deposits in high grade metamorphic terrane due to its hardness (8) and stability in metamorphic rocks (Parr 1992). Although rare, gahnite is reported in a number of polymetallic deposits (Chew 1977; Plimer 1977; Spry 1982, 1987a, 1987b; Williams 1983; Sheridan and Raymond 1984; Spry and Scott 1986). Gahnite was also successfully evaluated as an indicator mineral in glacial dispersal plumes from the Montauban polymetallic deposit in Quebec (Lalonde et al. 1994). Gahnite is not only an indicator of polymetallic deposits within high grade metamorphic terranes but also of pegmatite (Cerny et al. 1981; Cerny and Hawthorne 1982).

Little work has been done using mineral composition to differentiate gahnite found within different source rocks (Batchelor and Kinnaird 1984). Gahnite analytical work completed by (Morris 1996, 1997, 1998, 1999a) and Morris et al. (1997) indicate that gahnite from polymetallic deposits commonly has MgO values greater than 2 wt %. Gahnite from rare element pegmatite has MgO values commonly less than 2 wt % (Morris et al. 1997). Gahnite recovered from samples in this study were similarly classified.

Data Plotting Parameters

To identify areas or sites favorable for kimberlite, base metal, gold or carbonatite exploration, it is important to identify the location of important KIMs ("G10" Cr-pyrope garnet, "inclusion field" chromite), MMSIMs (gahnite, low Cr-diopside), gold grains (pristine and their relative abundance) and carbonatite indicator minerals (barite, perovskite, synchisite). The proportional dot diagrams presented in this report illustrate the relative abundance of heavy indicator minerals and their locations throughout the study area. These diagrams are based on statistics that involve calculating percentiles. The largest dots on the diagram represents heavy mineral concentrations from sites with values greater than the 95th percentile. Sites with these values are considered anomalous and significant.

The proportional dot diagrams in this report, in part, are based on data recalculated to account for those samples with large numbers of estimated grains. For reasons of practicality, estimates rather than precise counts of the number of heavy mineral indicators in some concentrates were inferred by the external lab (Morris 2000, Appendix A-5). For example, the heavy mineral concentrate of sample 1168-Ma-99 contained an estimate of 500 olivine grains, however, only 5 olivine grains were picked. The composition of the 5 olivines was used to infer the number of kimberlitic and non-kimberlitic grains. Examples of this type of calculation is summarized in Stephenson et al. (1999). Comparison of the number of grains picked vs. the number of grains estimated within the heavy mineral concentrate per site are presented in Appendix B for KIMs, MMSIMs, and carbonatite.

Heavy mineral concentrates were further normalized to a table feed weight of 10 kg. However, as this did not generate any additional anomalous sites or trends compared to the plotting of non-normalized data these results are not included in this report.

Summary proportional dot diagrams for KIMs, gold and carbonatite are based on total numbers of each suite of indicator minerals. However, this was not possible for the MMSIMs as some of the heavy minerals were reported as either actual grain counts (e.g., gahnite), as "trace" amounts (e.g., kyanite) or as a percentage of a particular grain size (e.g., orthopyroxene). Therefore, to determine the distribution of sites with anomalous MMSIMs, proportional statistics was completed for each MMSIM. Where an MMSIM was reported as a "trace", a value representing half the lowest recorded value was applied (0.25).

The sites were then ranked from 6 to 0 depended upon the number of anomalous (anomalous defined as > 95th percentile) MMSIMs determined for each site. For example, sample MA-1087-99 has the highest number of different MMSIMs, 6 (chalcopyrite, fluorite, gahnite, galena, sphalerite and spessartine) and was therefore given a ranking of 6. Site 1084-TM-99 was given a ranking of 4 as it consisted of 4 different types of anomalous MMSIMs (molybdenite, low Cr-diopside, native gold and olivine). Proportional statistics were then run on this ranking system, producing an MMSIM proportional dot diagram summarizing the distribution of those sites with the highest number of anomalous, individual, MMSIMs.

RESULTS

Bedrock Heavy Mineral Data

Locations for all bedrock samples are given in Appendix A (this report). Data for each bedrock sample is summarized in Morris (2000, Appendix B1 to B9). Classification of all rock samples and description of heavy mineral assemblages were made by Stu Averill, Overburden Drilling Management Ltd. Dr. R.P. Sage, of the Ontario Geological Survey, also classified and characterized the Prairie Lake 1 and 2 samples.

Ashton Lamprophyre

This rock sample was collected from a dike less than 2 m wide, exposed in a road cut less than 1 km west of the Little Pic Bridge, north side of Highway 17. The rock sample is classified as a mafic lamprophyre with an augite/diopside mineral assemblage (Morris 2000, Appendix B-1, B-6). Two gold grains (1 modified, 1 pristine; Morris 2000, Appendix B-4), 4 chalcopyrite and 40 of an estimated 56000 Cr-diopside grains (Morris 2000, Appendix B-5) were picked from the sample concentrate.

Sandspit Lamprophyre

This rock sample was collected from a dike less than 0.5 m wide. The dike is exposed at surface beside an abandoned logging road that extends northwest off the Jackpine Road, 2 km west of the south end of Sandspit Lake. The rock sample is classified as a mafic lamprophyre with an augite/diopside mineral assemblage (Morris 2000, Appendix B-1, B-6). Six of an estimated 15 olivine grains, 4 chromite grains, 1 ilmenite grain and 18 of an estimated 5800 Cr-diopside grains were picked from the sample concentrate (Morris 2000, Appendix B-5).

Killala Lake Gabbro

This rock sample was collected from an outcrop exposed beside an abandoned logging road north of Sandspit Lake. This sample is classified as an anorthosite with a fayalite-augite/apatite mineral assemblage (Morris 2000, Appendix B-1, B-6). Eighty-five percent and sixty percent of the minerals within the 0.25 to 0.5 mm and 0.5 to 1.0 mm fractions, respectively, consist of olivine. Six of an estimated 60 chalcopyrite grains were picked from the sample concentrate (Morris 2000, Appendix B-5).

Siliceous Sericite Schist

This rock sample, collected at the Cameco Gold Inc. Empress Hill property, is classified as a siliceous sericite schist with a goethite/pyrite mineral assemblage (Morris 2000, Appendix B-1). Fourteen modified and 237 pristine gold grains were recovered from this sample (Morris 2000, Appendix B-4). Ninety-eight percent of the sample's mineral fraction consists of pyrite (Morris 2000, Appendix B-7).

Felsic Stringer Sulphide

This rock sample, collected at Major General Resources Ltd. Spider Lake property, is classified as a felsic stringer sulphide with a chalcopyrite-sphalerite heavy mineral assemblage (Morris 2000, Appendix B-1, B-8). Two pristine gold grains were recovered (Morris 2000, Appendix B-4). Sixty percent of the mineral fraction consists of chalcopyrite and an estimate of 4000 sphalerite grains were observed in the sample concentrate (Morris 2000, Appendix B-7).

Killala Lake Syenite

This rock sample was collected from an outcrop exposed beside an abandoned logging road north of Sandspit Lake. This rock is classified as a nepheline syenite with a hornblende/fluorite mineral assemblage (Morris 2000, Appendix B-1, B-8). One percent of the mineral assemblage consists of pyrite and 89 fluorite grains were recovered (Morris 2000, Appendix B-7).

Prairie Lake Samples 1 and 2

These rock samples were classified as a diabase or meta-gabbro with an augite/leucoxene mineral assemblage (Morris 2000, Appendix B-1, B-8). Carbonate veins occur within each sample. Within the meta-gabbro, plagioclase feldspar grains are interlocking and they appear very turbid from alteration. The alteration minerals are too tiny to identify optically, however, the alteration may be a saussuritization, which would provide an alteration mineral assemblage of epidote-sericite-carbonate. The alteration can be found in Archean rocks that are not related to carbonatite magmatism.

Opaque minerals are skeletal in outline, possibly magnetite or ilmenite. The mafic minerals are actinolitic amphibole. Occasional relicts of clinopyroxene may occur in the larger amphibole grains. The quartz is anhedral and interstitial. The quartz is disseminated throughout in tiny grains and can be either a primary or secondary mineral.

The carbonate vein is generally very fine-grained and contains tiny grains of quartz. Along one margin of the vein the carbonate is coarse and in sharp contact with the fine-grained carbonate. The carbonate vein from Prairie Lake 1 may represent 2 stages of emplacement. Assuming the carbonate veins from Prairie Lake samples 1 and 2 are related, they may represent the distal effects of a fenitization process accompanying carbonatite emplacement. This would be a low temperature hydrothermal feature.

Further examination of these rock samples by the OGL found that the diabase consisted of carbonate-rich stringers, the matrix being ankerite with minor manganese. Minerals identified within the carbonate stringers include siderite, Nb-rutile, barite, parisite, synchisite, zircon, pyrite, thorite, sphalerite and apatite.

Cr-Diopside Data

Cr-diopsides were recovered from the Ashton lamprophyre (40 grains), the Sandspit lamprophyre (18 grains), the Empress Hill sericite schist (1 grain) and the Spider Lake felsic stringer (3 grains). The oxide data is presented in Morris (2000, Appendix B-9). In addition, 19 Cr-diopsides were analyzed from the Prairie Lake Carbonatite (Sage et al., in prep.). This data is presented in Figure 4. Note that all grains plot outside the kimberlite template.

Olivine Data

Olivine was recovered from the Sandspit lamprophyre (6 grains) and the Killala Lake gabbro (6 grains). The oxide data is summarized in Morris (2000, Appendix B-9) and presented in Figure 5. Note that all grains have F_o values between 40 and 80.

Chromite and Ilmenite Data

Four chromite grains and 1 ilmenite grain was recovered from the Sandspit lamprophyre. The oxide data is summarized in Morris (2000, Appendix B-1). The ilmenite has an MgO value of less than 4 wt % and would therefore not be classified as a KIM.

The chromites plot below the "Diamond Intergrowth" and Diamond Inclusion" fields of the Fipke et al. (1995) Cr_2O_3 vs. MgO wt % plot (Figure 6). They do plot in the overlap field of the Fipke et al. (1995) Cr_2O_3 vs. TiO_2 wt % plot (Figure 7).

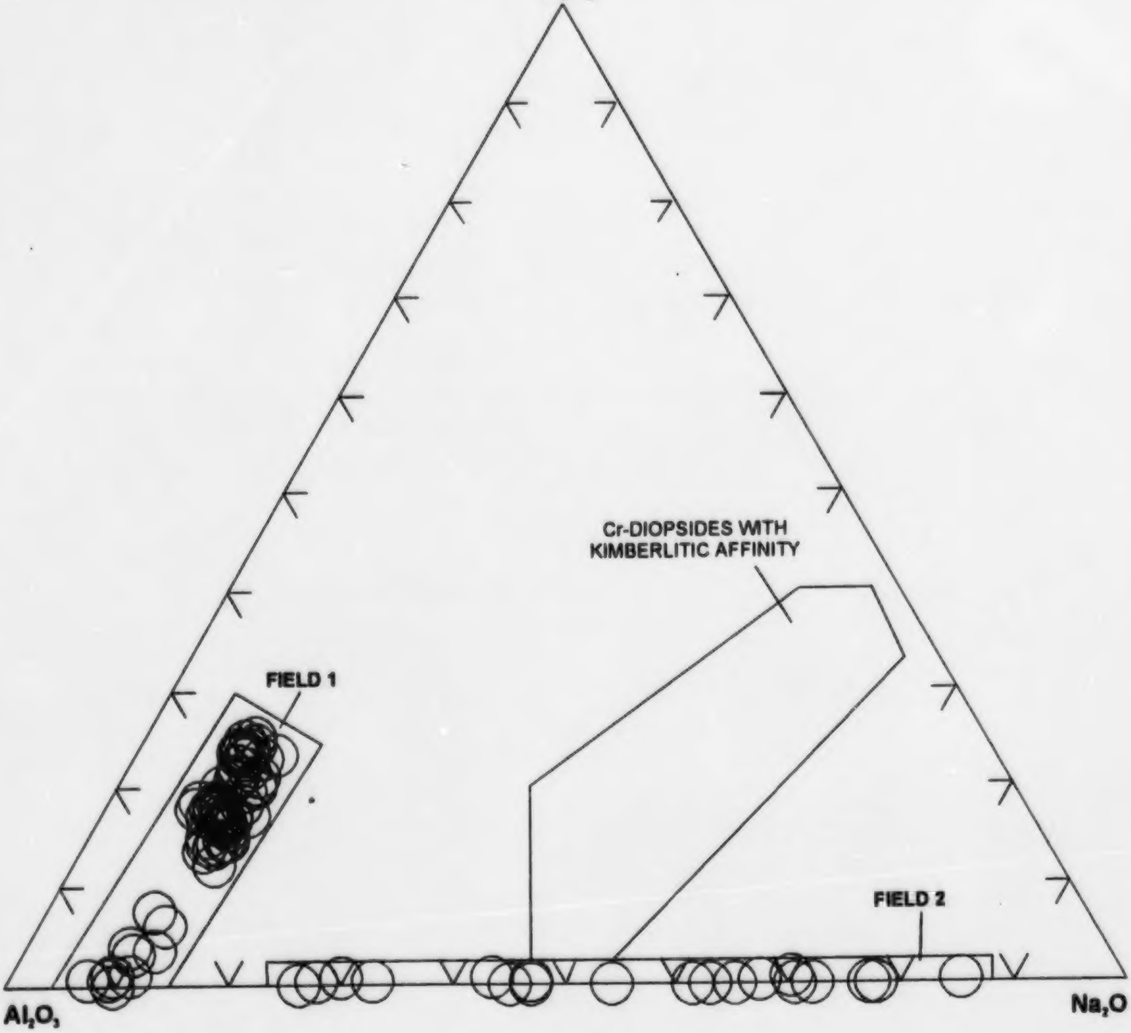


Figure 4. Ternary plot of Cr-diopside derived from local bedrock. Field 1 = Cr-diopside from the Ashton lamprophyre, Sandspit Lake lamprophyre, Empress Hill sericite schist, Spider Lake felsic sulphide stringer. Field 2 = Cr-diopside from the Prairie Lake Carbonatite.

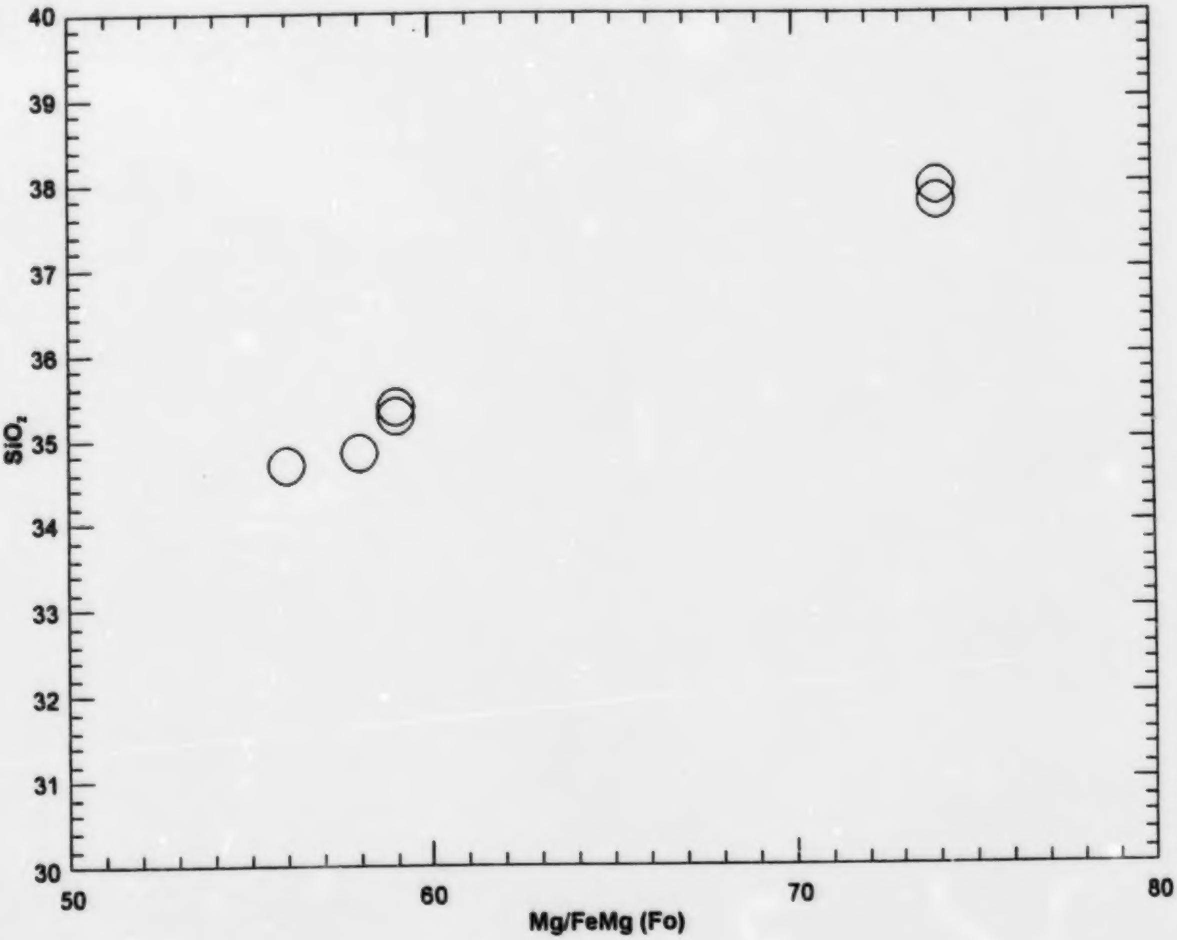


Figure 5. Binary plot of olivine data derived from local bedrock. These grains, recovered from the Sandspit lamprophyre and the Killala Lake gabbro, have Fo values between 50 and 80.

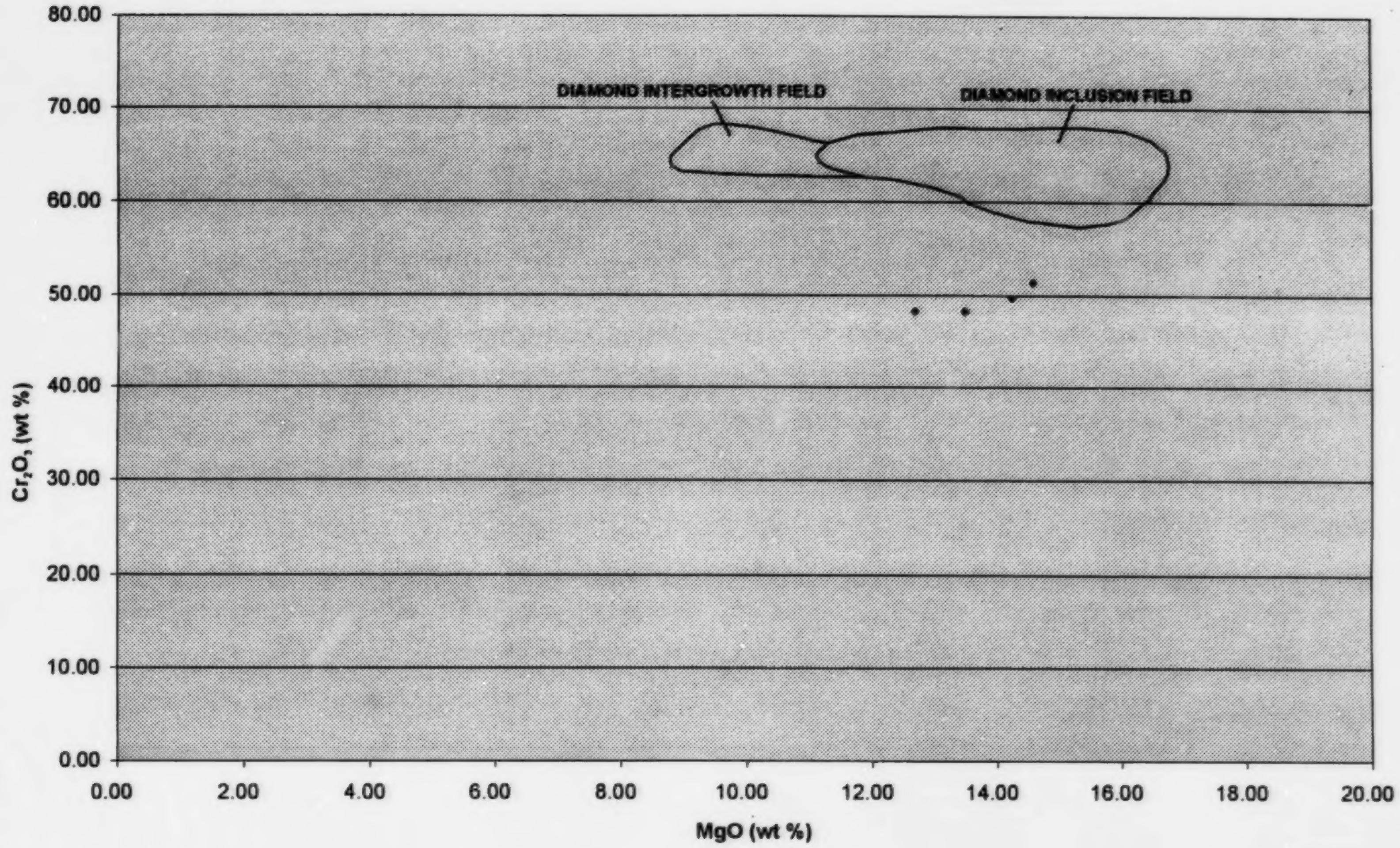


Figure 6. Cr_2O_3-MgO chromite plot derived from the Sandspit lamprophyre and Killala Lake gabbro. Diagram after Fipke et al. (1995).

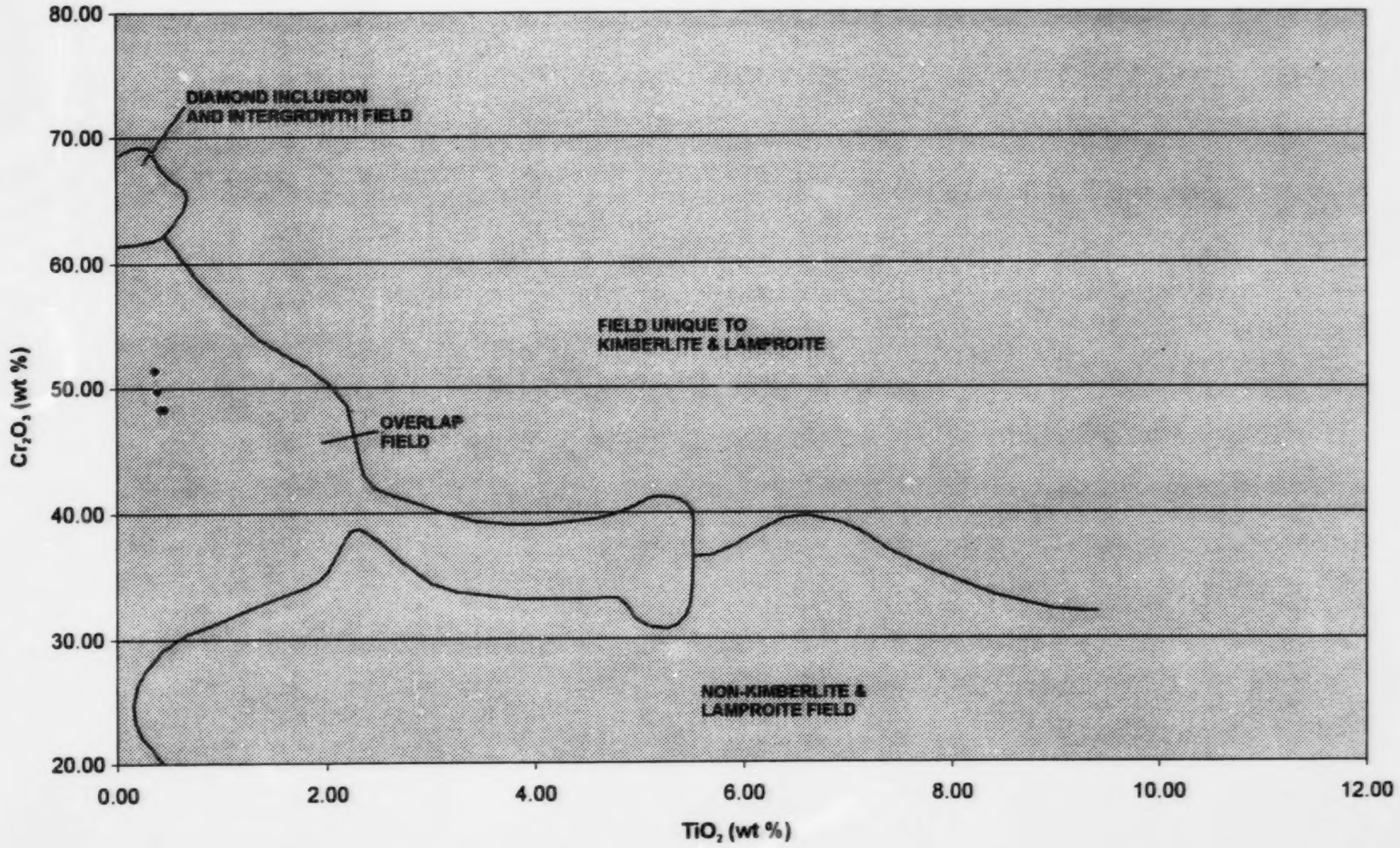


Figure 7. Cr_2O_3-TiO_2 chromite plot derived from the Sandspit lamprophyre and Killala Lake gabbro. Diagram after Fipke et al. (1995).

Overburden Orientation Surveys

Samples associated with each of the orientation surveys are summarized in Table 2. Detailed information on the heavy mineral assemblage for each sample is summarized in Morris (2000, Appendix A-8).

Orientation Survey	Samples
Prairie Lake Carbonatite	1063-Ma-99
	388-Tm-99
	393-Tm-99
	398-Tm-99
	403-Tm-99
Cameco Empress Hill Gold Property	483-Ma-99
	466-Ma-99
	490-Ma-99
	492-Ma-99
	471-Tm-99
	476-Tm-99
	481-Tm-99
	488-Tm-99
	Sericte schist bedrock sample
Major General Spider Lake Base Metal Property	413-Ma-99
	415-Ma-99
	425-Tm-99
	430-Tm-99
	435-Tm-99
	442-Tm-99
	447-Tm-99
	452-Tm-99
	457-Tm-99
	462-Tm-99
	Felsic stringer sulphide bedrock sample

Table 2. Summary of samples associated with orientation surveys.

Prairie Lake Carbonatite

The minerology of carbonatites is complex and the reader is referred to Heinrich (1966) for a complete list of related minerals. Table 3 summarizes minerals recovered from overburden samples collected over the Prairie Lake Carbonatite and those cited in the literature. A number of bi- and poly-minerals were picked from the samples. Where this occurred, the mineral was included as an indicator if one of the minerals was either cited in the literature as an indicator of carbonatite or recovered from a sample taken over the carbonatite (i.e., diopside).

Mineral	Andradite	Apatite	Apatite+Pyrochlore	Augite	Barite	Bastnasite	Diopside	Diopside-Hedenbergite	Diopside-Hedenbergite+Ti-Mag	Hedenbergite	Hedenbergite+Ti-Magnetite	Ilmenite	Ilmenorutile	Monazite	Nb-Perovskite	Perovskite	Pyrochlore	Rutile	Synchysite	Ti-Andradite	Titanite	Zircon	Total
Source																							
388-Tm-99		5	1						1		1			2	627*								637
393-Tm-99	10							3		3						32							48
398-Tm-99										1										55			56
403-Tm-99		15														1103*					5		1123
1063-Ma-99	5	12								3					1109*	2	30						1161
Literature*	X			X	X	X	X			X		X		X		X	X	X	X	X		X	

Ma: Modern Alluvium Sample
Tm: Till Sample
Mag.: Magnetite

* From Heinrich (1966), Sage (1987) and Sage et al. (in prep).

Table 3. Summary of minerals associated with carbonatite. Note that this list is not complete, for a complete list the reader is refered to Heinrich (1966). Number refers to the number of grains recovered from each sample, "X" refers to citation in the literature. Those values with an (*) are the estimated number of grains within a sample's heavy mineral concentrate as made by the lab. Reporting minerals as composites is required as minerals in sample occur as bi- and polymineralic phases.

Spider Lake Base Metal

Four till and 2 modern alluvium samples were collected in the Spider Lake area on ground held by Major General Resources Ltd. Heavy minerals associated with base metal deposits are summarized in Table 4. Of particular interest are the high numbers of chromite, pyrite and low Cr-diopside grains.

Mineral	Chalcopyrite	Chromite	Corundum	Kyanite	Low Cr-Diopside	Native Gold	Orthopyroxene (%)	Pyrite	Sapphirine	Sillimite	Staurolite	Topaz
Source												
413-Ma-99	0	0	0	0	0	0	Tr	20	0	Tr	Tr	0
415-Ma-99	0	2	0	0	2	0	Tr	5	0	0	Tr	0
425-Tm-99	0	0	0	0	3	2	Tr	0	0	0	0	0
430-Tm-99	0	0	0	0	1	0	Tr	250*	0	0	0	0
435-Tm-99	0	1	0	Tr	1	0	0	750*	1	0	0	0
442-Tm-99	0	0	0	Tr	2	0	0	1200*	0	0	0	0
447-Tm-99	2	0	0	0	1	0	0	2500*	0	0	0	0
452-Tm-99	0	1847*	0	Tr	0	0	Tr	0	0	0	Tr	Tr
457-Tm-99	0	0	1	Tr	1	0	Tr	0	0	0	0	0
462-Tm-99	0	1	0	0	17	0	Tr	5	0	0	0	Tr

Table 4. Summary of minerals and number of grains recovered from samples collected over the Spider Lake base metal deposit. Those values with an (*) are the estimated number of grains within a sample's heavy mineral concentrate as made by the lab.

Empress Hill Gold

Four till and 4 modern alluvium samples were collected in the Empress Hill area on ground held by Cameco Gold Inc. Of these samples, one modern alluvium (483-Ma-99) and one till sample (488-Tm-99) were collected directly downstream and beside an exposure of sericite schist. These 2 samples yielded the highest gold grain numbers (Table 5). The other 6 samples yielded fewer gold grains suggesting that sites not directly associated with gold mineralization will not contain many, if any, gold grains. Additional sampling is required in this area to fully understand the distance of gold grain dispersal associated with both stream and glacial transport.

Sample No.	U.T.M.		Gold Grain Types and Totals			
	Easting	Northing	Total	Reshaped	Modified	Pristine Gold
466-Ma-99	501638	5411791	0	0	0	0
483-Ma-99	502491	5412367	391	1	1	389
490-Ma-99	500558	5411492	0	0	0	0
492-Ma-99	500665	5411589	2	2	0	0
471-Tm-99	501518	5411772	2	0	0	2
476-Tm-99	501633	5411918	4	3	0	1
481-Tm-99	502137	5412198	1	1	0	0
488-Tm-99	502545	5412302	1096	3	0	1093

Table 5. Gold results from samples collected for a gold orientation survey, Cameco Gold Inc. property, Empress Hill.

Regional Surveys

Pebbles

Pebble lithology data is commonly used to evaluate proximity of an overburden heavy mineral or geochemical signature to source (Morris et al. 1998; McMartin 2000; Stephenson et al. 1999). However, determining pebble lithology is particularly difficult in the Killala Lake area due to the complex composition of some rock types. For example, the migmatite suite may consist locally of metavolcanic rocks, minor metasedimentary rocks and mafic and/or granitic gneisses. As another example, the presence of carbonate pebbles in overburden samples is often used to argue that a component of the material associated with those samples is derived from the Hudson Bay Lowland. However, because carbonatite occurs in this study area, only carbonate pebbles containing fossils can be attributed to the Hudson Bay Lowland.

Therefore, the use of pebble data alone to evaluate proximity of an anomalous heavy mineral signature to source is not recommended. This data is obviously useful where the pebble lithology composition of a sample strongly reflects the local bedrock type, such as sample 110-Map-99 (Figure 8a). However, complications arise where the pebble lithology composition of a sample consists of many different pebble lithologies, and may either reflect the lithology of the local bedrock or may represent material transport to the site from distal sources (sample 172-Map-99, Figure 8b).

Kimberlite Indicator Minerals

Garnet

Of the 277 garnets submitted to the OGL for microprobe analysis, 5 were determined to be "G10" Cr-pyrope garnets and 34 were identified as "G9" Cr-Pyrope garnets (Figure 9). Five grains were identified as eclogitic garnets, one of these classified as a Group 1 eclogite (Figure 10). Thirteen of the garnet grains classify as megacrysts (Figure 10), 74 as crustal, 141 as andradite and 5 as "others." Microprobe data for all grains is

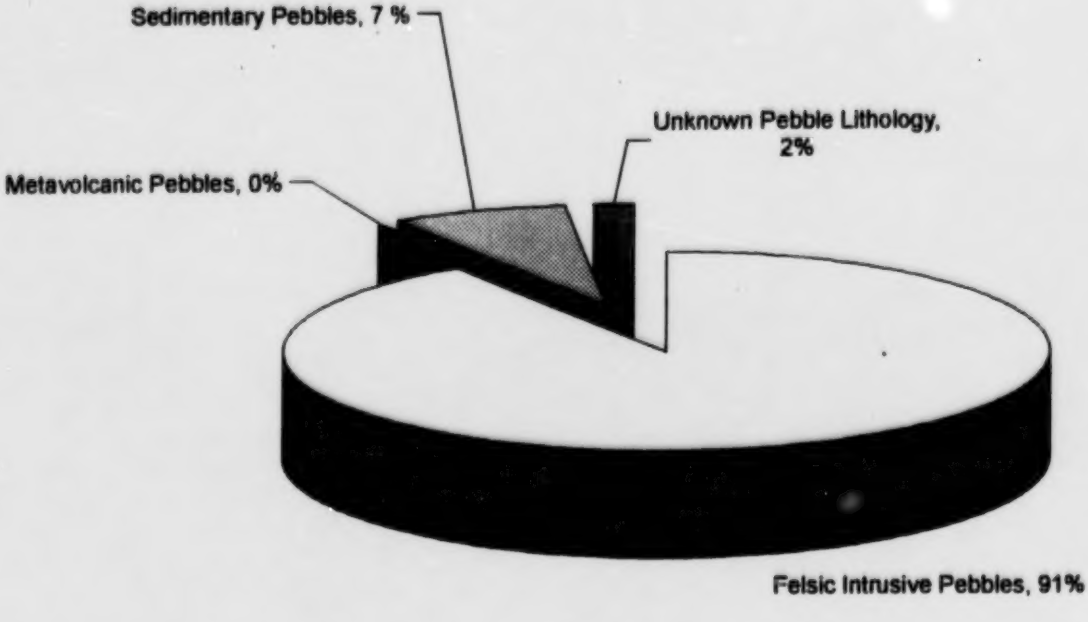


Figure 8a. Pebble lithology, sample 110-Map-99, from Felsic Intrusive terrane.

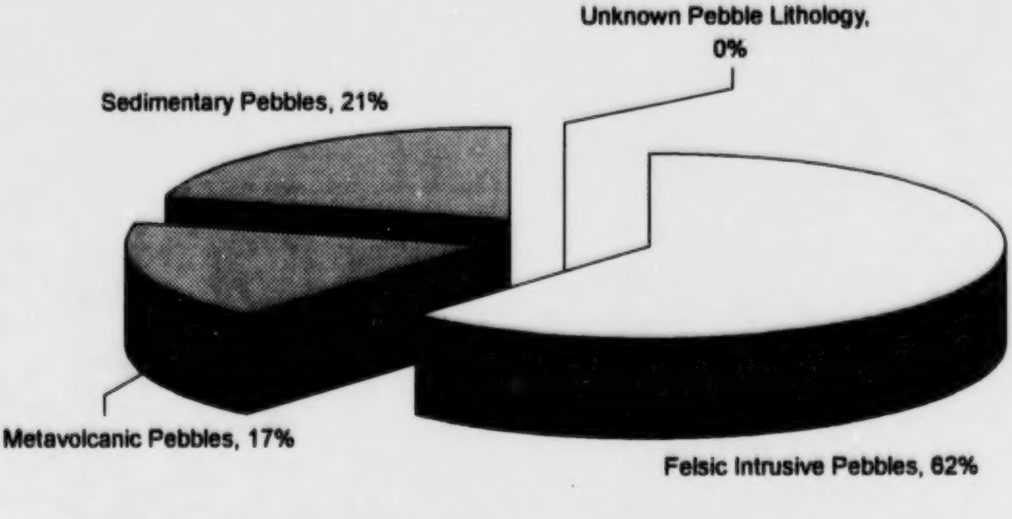


Figure 8b. Pebble lithology, sample 172-Map-99, from metasedimentary terrane.

Figure 8. Pebble lithology of modern alluvium samples 110 and 172-Map-99. Sample 172-Map-99 illustrates a regional pebble sample and 110-Map-99 a local one.

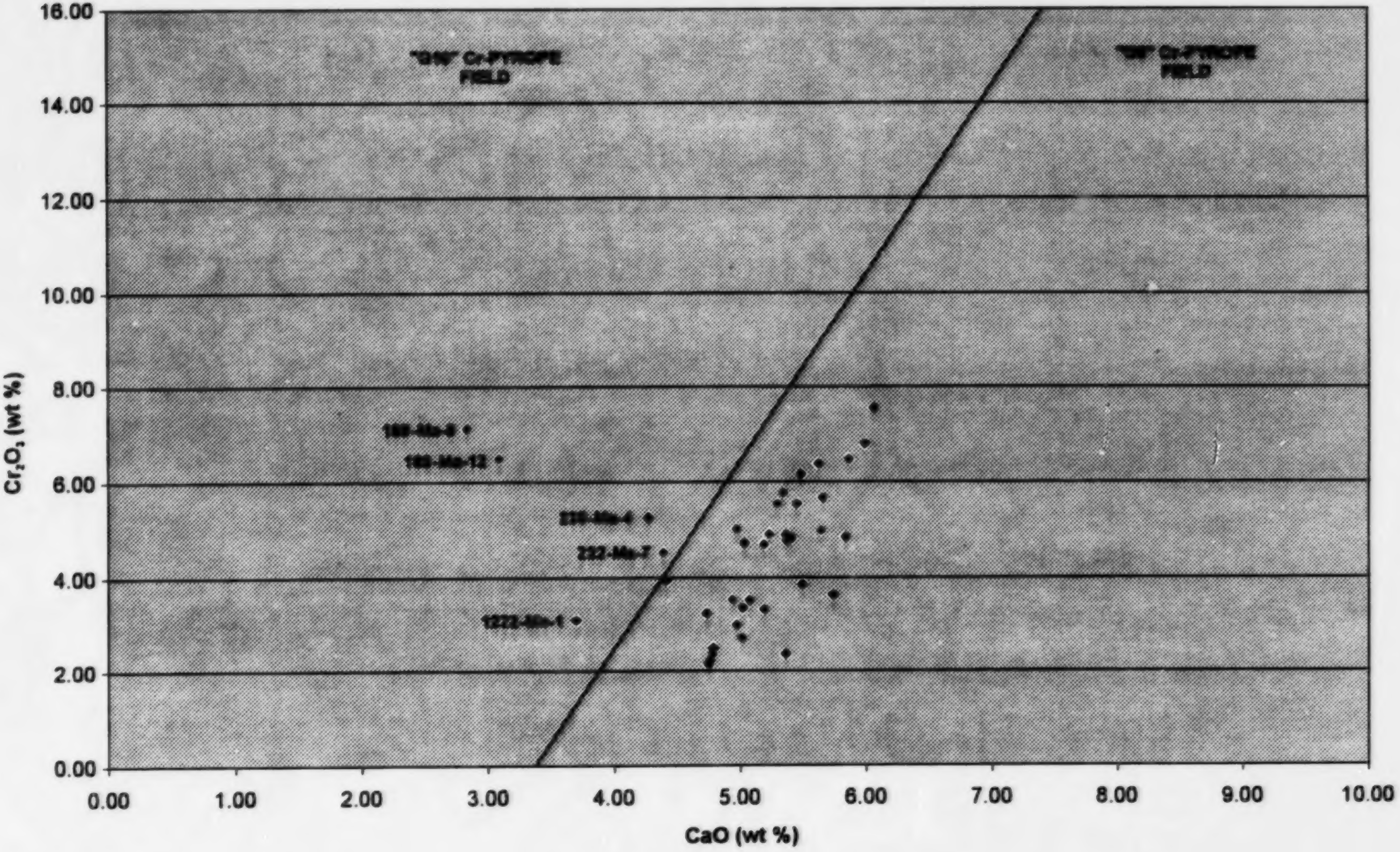


Figure 9. "G10" and "G9" Cr-pyrope garnet Cr_2O_3-CaO plot (diagram after Dawson and Stephens 1975).

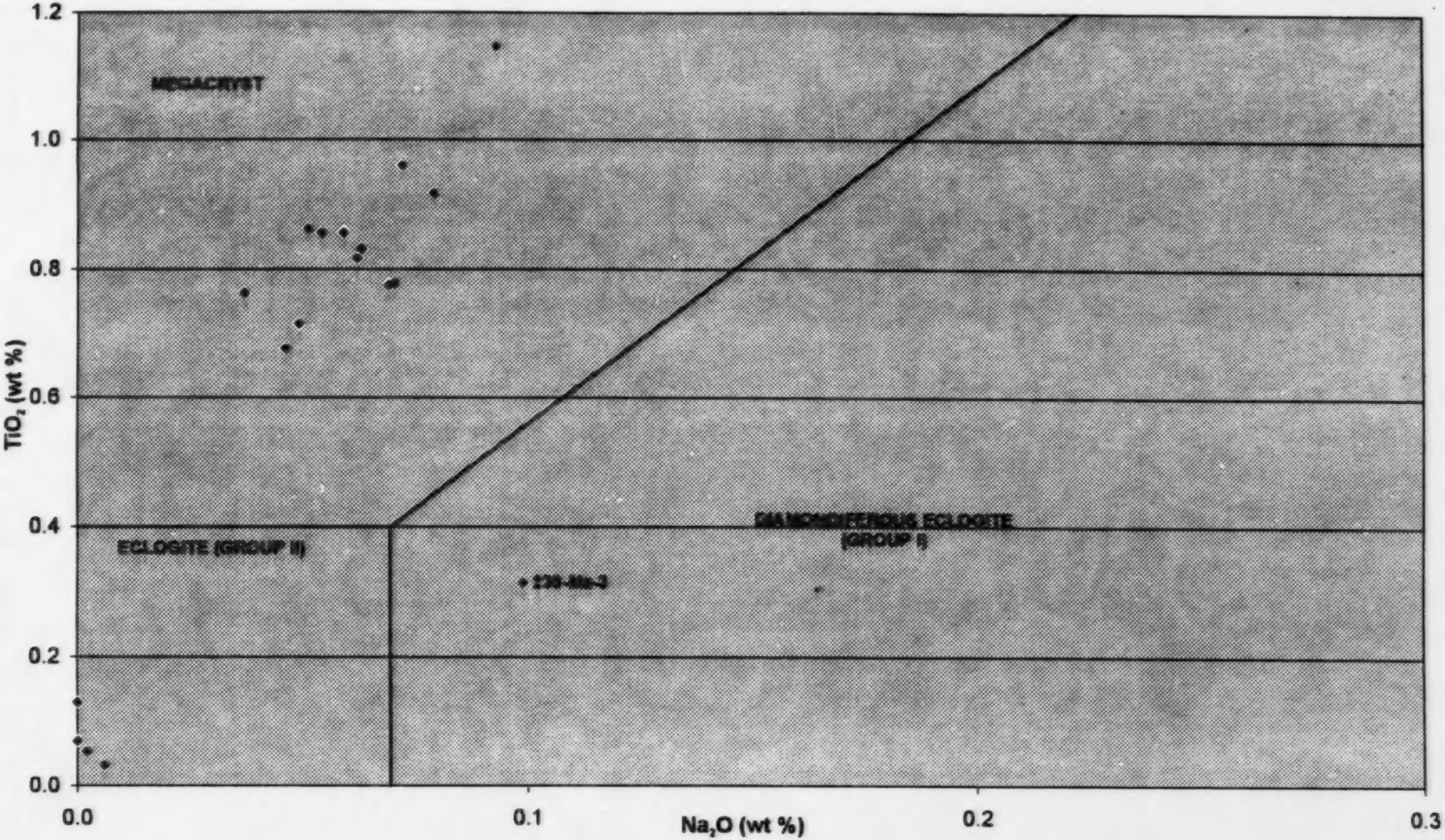


Figure 10. Eclogite-megacryst TiO$_2$-Na$_2$O plot (diagram after Schultze 1999).

summarized in Morris (2000, Appendix A-9). Summary statistics for the Cr-pyrope garnets is provided in Table 6.

A proportional dot distribution diagram of the "total" garnet data set illustrates 3 areas and 8 individual sample sites where anomalous concentrations of "G10s", "G9s", eclogites or megacrysts exist (Figure 11). The 3 areas include the: 1) Upper Little Pic River (samples 230-Ma-99, 232-Ma-99, 228-Ma-99); 2) Islington Lake (samples 171-Ma-99, 189-Ma-99); and 3) Wellwood Lake (samples 379-Ma-99, 383-Ma-99, 1077-Ma-99, 1079-Ma-99). Several individual sample sites yielding interesting garnets include: samples 1260-Ma-99, 492-Ma-99, 1222-Ma-99, 1277-Ma-99, 1018-Ma-99, 51-Tm-99, 234-Ma-99 and 1174-Ma-99. Note that the 3 areas outlined on Figure 11 occur along or in close proximity to the TSTZ. Several of the individual sites are associated with the Killala Lake deformation zone (samples 1174-Ma-99, 234-Ma-99, 1277-Ma-99). The other individual sites are associated with faults which control the orientation of rivers or streams (samples 1260-Ma-99, 492-Ma-99, 1018-Ma-99) or lakes (samples 1222-Ma-99, 51-Tm-99).

Chromite

Three hundred and four chromite grains were submitted to the OGL for microprobe analysis (Morris 2000, Appendix A-9). Of these grains, one plotted in the diamond inclusion field of the Fipke et al. (1995) $MgO-Cr_2O_3$ diagram (sample 52-Ma-99, Figure 12) and one plotted in the field unique to kimberlites and lamproites of the Fipke et al. (1995) $TiO_2-Cr_2O_3$ diagram (sample 1111-Ma-99, Figure 13). Two hundred and ninety-seven grains plotted in the overlap field and 6 in the non-lamproitic/ kimberlitic field of the Fipke et al. (1995) $TiO_2-Cr_2O_3$ diagram. Note that 2 grains (samples 189-Ma-16, 462-Tm-39) plotted within the diamond inclusion and intergrowth field of the Fipke et al. (1995) $TiO_2-Cr_2O_3$ diagram. These were included within the overlap field only, however, as their MgO values are regarded as being too low to include in the diamond intergrowth or inclusion field (Morris 2000, Appendix A-9). Summary statistics for the chromite data is summarized in Table 6.

Three areas and several individual sites stand-out as potential exploration targets for kimberlite based on the chromite data (Figure 14). These areas include: 1) Islington Lake (samples 171-Ma-99, 189-Ma-99); 2) Jackfish Lake (samples 476-Tm-99, 371-Ma-99, 373-Ma-99); and 3) Steel Mountain-McKellar Harbour (samples 405-Ma-99, 1111-Ma-99, 1258-Ma-99, 1262-Ma-99, 452-Tm-99, 1195-Tm-99). The latter 2 areas are known to have lamprophyres and site 1111-Ma-99 has a chromite grain that plots in the field exclusive to kimberlite and lamproite. Caution should, therefore, be exercised in interpreting these chromite signatures as being kimberlitic. A prominent suite of mafic and felsic metavolcanic bedrock occurs in these areas. Many of the chromite grains may relate to base metal mineralization (*see* MMSIM section).

Mg-Ilmenite

Of the 539 ilmenite grains submitted for microprobe analysis, 375 were classified as Mg-ilmenite (Morris 2000, Appendix A-9). Summary statistics for the Mg-ilmenite data is

Media	General Statistics		Percentile Statistics			
	Total Grains	Maximum per Sample Site	95th	90th	75th	50th
Modern Alluvium (values based on number of grains observed and picked from sample)						
"G10s"	5	2	0	0	0	0
"G9s"	28	5	1	0	0	0
Eclogite I	1	1	0	0	0	0
Eclogite II	4	1	0	0	0	0
Megacryst	13	3	0	0	0	0
Inclusion Field Chromite	1	1	0	0	0	0
Kimberlitic Chromite	1	1	0	0	0	0
Modern Alluvium (values recalculated to estimated number of grains in sample concentrate)						
Chromite	761	350	5	2	0	0
Mg-Ilmenite	940	459	4	1	0	0
Cr-Diopside	65	8	2	1	0	0
Olivine	1863	603	4	1	0	0
Total KIMs	3676	603	80	14	2	0
Till (values based on number of grains observed and picked from sample)						
"G10s"	0	0	0	0	0	0
"G9s"	6	2	1	0	0	0
Eclogite I	0	0	0	0	0	0
Eclogite II	0	0	0	0	0	0
Megacryst	0	0	0	0	0	0
Inclusion Field Chromite	0	0	0	0	0	0
Kimberlitic Chromite	0	0	0	0	0	0
Mg-Ilmenite	15	4	1	1	0	0
Cr-Diopside	8	2	1	0	0	0
Till (values recalculated to estimated number of grains in sample concentrate)						
Chromite	1869	1847	1	1	0	0
Olivine	122	53	0	0	0	0
Total KIMs	2019	1848	8	3	1	0

Table 6. Summary statistics for KIMs. Values presented here are subdivided based on material from which the grains were recovered and on whether the values are recalculated to account for estimated numbers of grains within a sample's heavy mineral concentrate. A summary of the number of grains observed and picked per site as well as those sites with an estimated number of grains are summarized in Appendix B. Detailed discussion on how values were determined from sites with an estimated value is presented in the data plotting parameter section of this report.

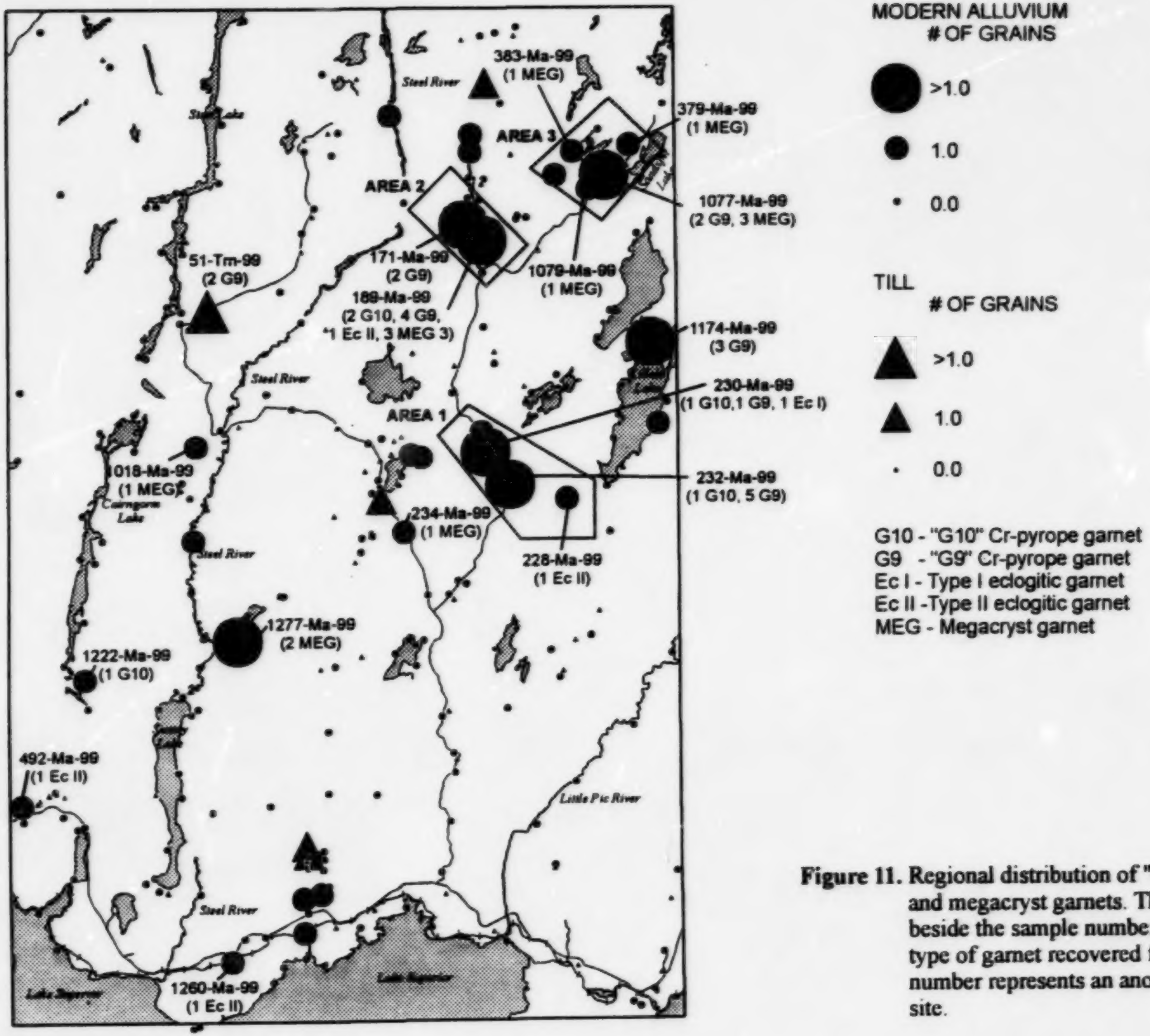

MODERN ALLUVIUM
# OF GRAINS
>1.0
1.0
0.0
TILL
# OF GRAINS
>1.0
1.0
0.0
G10 - "G10" Cr-pyrope garnet
G9 - "G9" Cr-pyrope garnet
Ec I - Type I eclogitic garnet
Ec II -Type II eclogitic garnet
MEG - Megacryst garnet
383-Ma-99
(1 MEG)
379-Ma-99
(1 MEG)
1077-Ma-99
(2 G9, 3 MEG)
1079-Ma-99
(1 MEG)
AREA 3
AREA 2
AREA 1
171-Ma-99
(2 G9)
189-Ma-99
(2 G10, 4 G9,
*1 Ec II, 3 MEG 3)
51-Tm-99
(2 G9)
1174-Ma-99
(3 G9)
230-Ma-99
(1 G10,1 G9, 1 Ec I)
232-Ma-99
(1 G10, 5 G9)
228-Ma-99
(1 Ec II)
234-Ma-99
(1 MEG)
1018-Ma-99
(1 MEG)
1277-Ma-99
(2 MEG)
1222-Ma-99
(1 G10)
492-Ma-99
(1 Ec II)
1260-Ma-99
(1 Ec II)
Steel River
Steel Lake
Cairngorm Lake
Little Pic River
Lake Superior

Figure 11. Regional distribution of "G10", "G9", eclogite (I and II) and megacryst garnets. The number and acronym beside the sample number represents the number and type of garnet recovered from that site. Note that each number represents an anomalous value for that sample site.

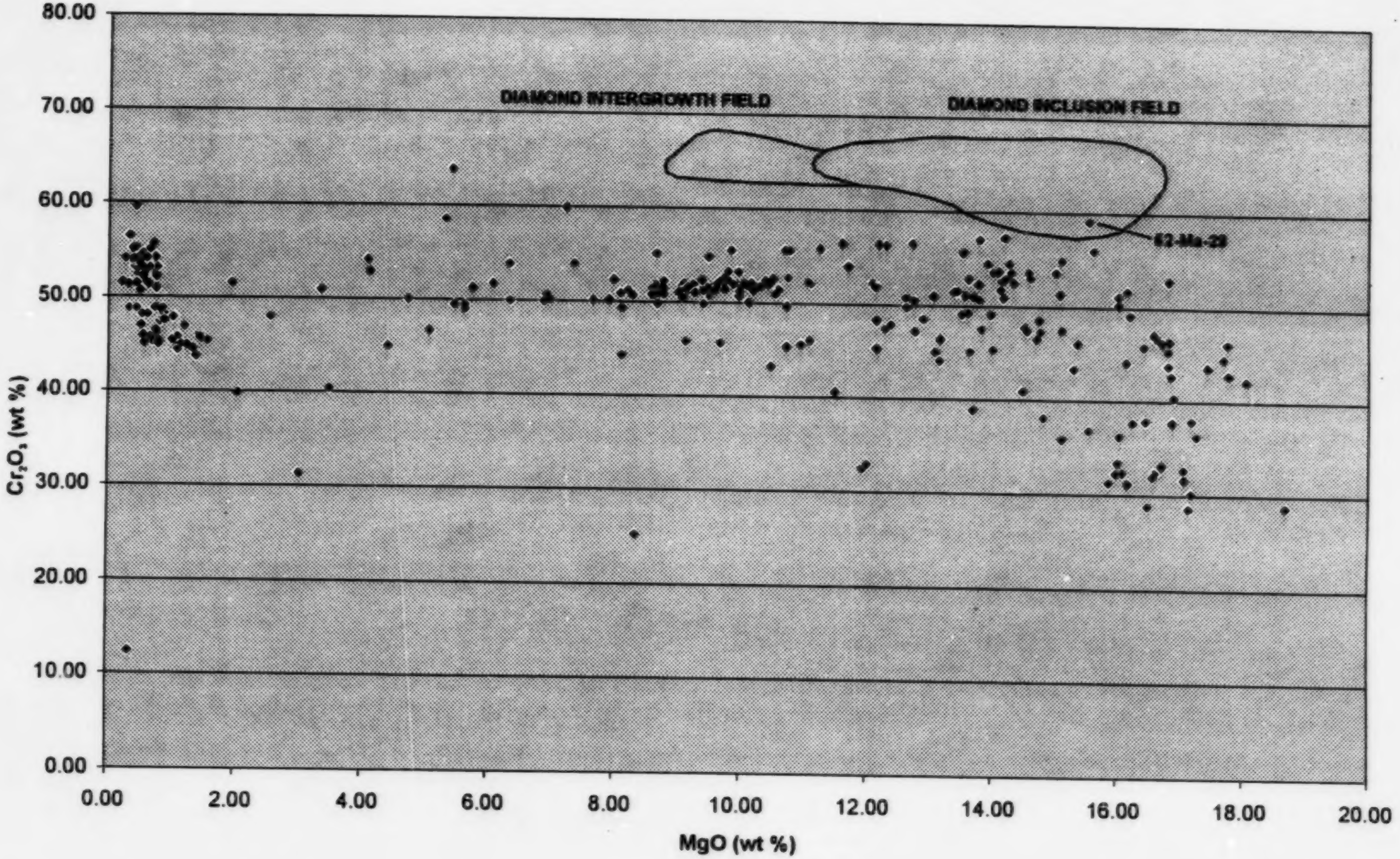


Figure 12. Chromite Cr_2O_3-MgO plot (diagram after Fipke et al. 1995). One grain plots within the diamond inclusion field.

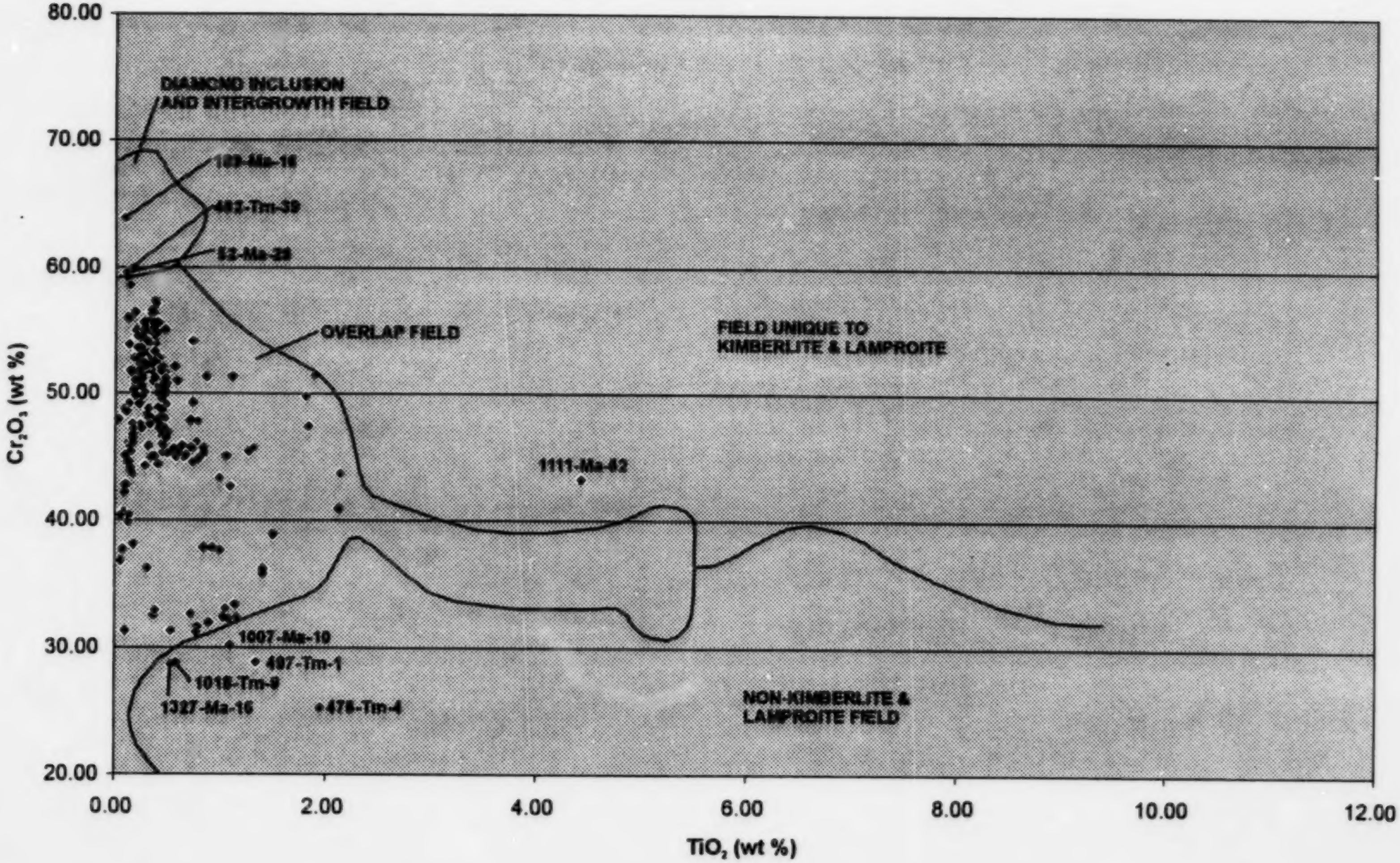
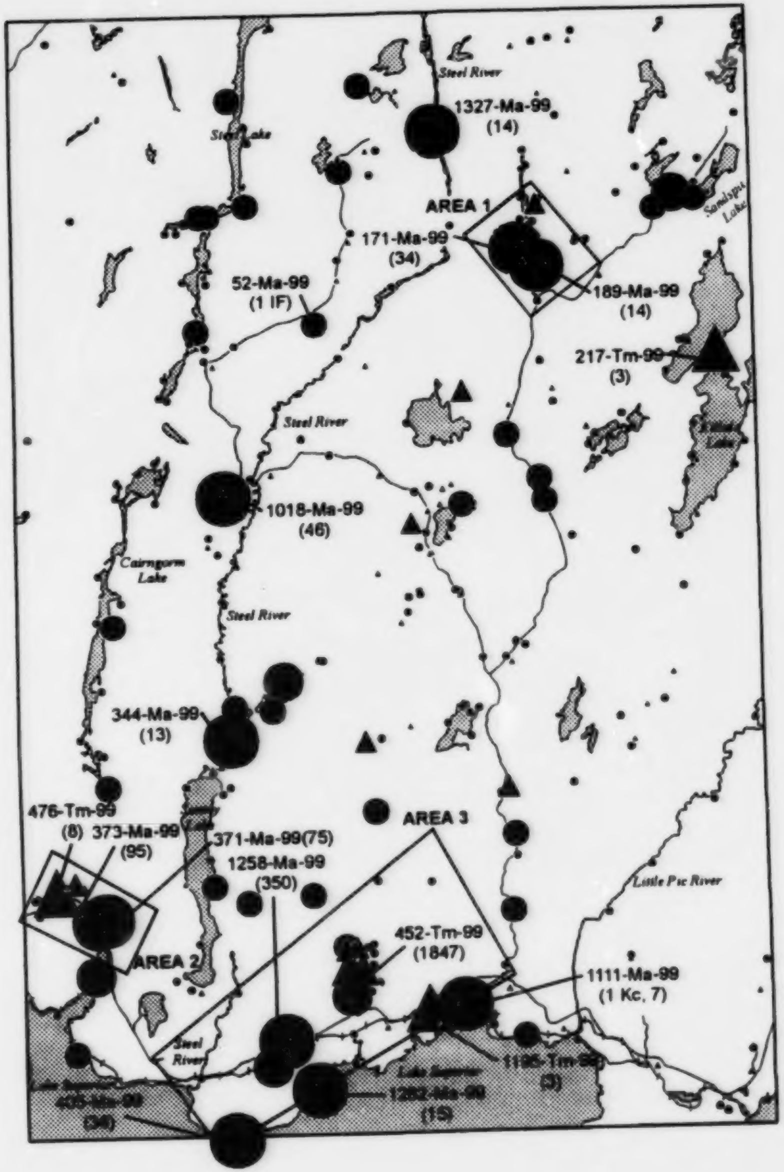


Figure 13. Chromite Cr_2O_3-TiO_2 plot (diagram after Fipke et al. 1995). Note the 3 grains which plot within the diamond inclusion and intergrowth field. Grains 189-Ma-16 and 462-Tm-39 both have low MgO values (see Figure 12) and are not considered to be diamond inclusion field grains.



Steel River
Steel Lake
1327-Ma-99
(14)
AREA 1
171-Ma-99
(34)
52-Ma-99
(1 IF)
189-Ma-99
(14)
Sandspit Lake
217-Tm-99
(3)
Steel River
1018-Ma-99
(46)
Cairngorm Lake
Steel River
344-Ma-99
(13)
476-Tm-99
(8)
373-Ma-99
(95)
371-Ma-99(75)
1258-Ma-99
(350)
AREA 3
AREA 2
452-Tm-99
(1847)
Little Pic River
1111-Ma-99
(1 Kc, 7)
Steel River
Lake Superior
1195-Tm-99
(3)
1282-Ma-99
(15)
435-Ma-99
(34)
MODERN ALLUVIUM
# OF GRAINS
>5.0
5.0
2.0
0.0
TILL
# OF GRAINS
>1.0
1.0
0.0
IF: Inclusion field
Kc: Kimberlite Chromite

Figure 14. Regional distribution of chromite grains. The number in brackets represents the number of chromite grains recovered from that site. All grain numbers are recalculated estimates except for 5 samples (52-Ma-99, 217-Tm-99, 1111-Ma-99, 1195-Tm-99, 1327-Ma-99) which were not recalculated to an estimated number of grains in the sample concentrate. For discussion on how values were recalculated to account for estimated number of grains, see data plotting parameter section, this report.

summarized in Table 6. Microprobe data determined from those Mg-ilmenites submitted to the OGL were plotted on the Gurney and Moore (1991) Mg-ilmenite parabolic plot (Figure 15)(Table 7). None of the values presented in Figure 15 and Table 7 are based on recalculating values to account for estimated number of grains observed in a samples heavy mineral concentrate. The reducing field indicates magma conditions favourable for diamond preservation while the oxidizing field indicates magma conditions conducive to diamond resorption. A number of grains from individual samples plotted in both the reducing and oxidizing fields (Table 7). This suggests that Mg-ilmenites were derived either from several different kimberlites or from different phases within a single pipe. There are 2 very strong trends in the distribution of the parabolic plot, the significance of which is currently unknown.

The Wellwood Lake area is the one area where several samples from different sites having anomalous numbers of Mg-ilmenites occurs (samples 379-Ma-99, 377-Ma-99, 383-Ma-99, 1077-Ma-99, 1079-Ma-99)(Figure 16). There are also several additional sites scattered throughout the area (Figure 16) that have anomalous numbers of Mg-Ilmenite grains.

Cr-Diopsides

Three thousand, four hundred and eighty four Cr-diopside grains were submitted to the OGL for microprobe analysis. Of these, 59 are of kimberlitic affinity (51 from modern alluvium, 8 from till samples) (Figure 17)(Morris 2000, Appendix A-9). Nine hundred and twenty-four are Cr-diopsides (855 from modern alluvium, 69 from till samples), 2378 are low Cr-diopsides (2167 from modern alluvium, 211 from till samples), 99 are augite (from modern alluvium) and 24 are classified as other grains.

There are 6 samples that contain Cr-diopside grains with kimberlitic affinities. The locations of these are summarized on Figure 18. Summary statistics for the Cr-diopsides are presented in Table 6.

Olivine

Eight hundred and forty-six olivine grains were submitted to the OGL for microprobe analysis. Of these, 6 are of syenitic affinity (1 from modern alluvium, 5 from till samples), 479 are of mafic affinity (415 from modern alluvium, 64 from till), 316 are of mafic and/or kimberlitic affinity (245 from modern alluvium, 71 from till samples) and 45 are other grains (Figure 19)(Morris 2000, Appendix A-9). Summary statistics for the olivines are presented in Table 6.

There are 3 areas where anomalous concentrations of olivine occur (Figure 20). These areas are: 1) southwest Coldwell Alkalic Complex (samples 1126-Tm-99, 1131-Tm-99, 1136-Ma-99); 2) Ashburton Bay (samples 1087-Ma-99, 1111-Ma-99, 1262-Ma-99, 1264-Ma-99); and 3) west side of Killala Lake Alkalic Complex (samples 1168-Ma-99, 1169-Ma-99, 1171-Ma-99, 1173-Ma-99, 1174-Ma-99).

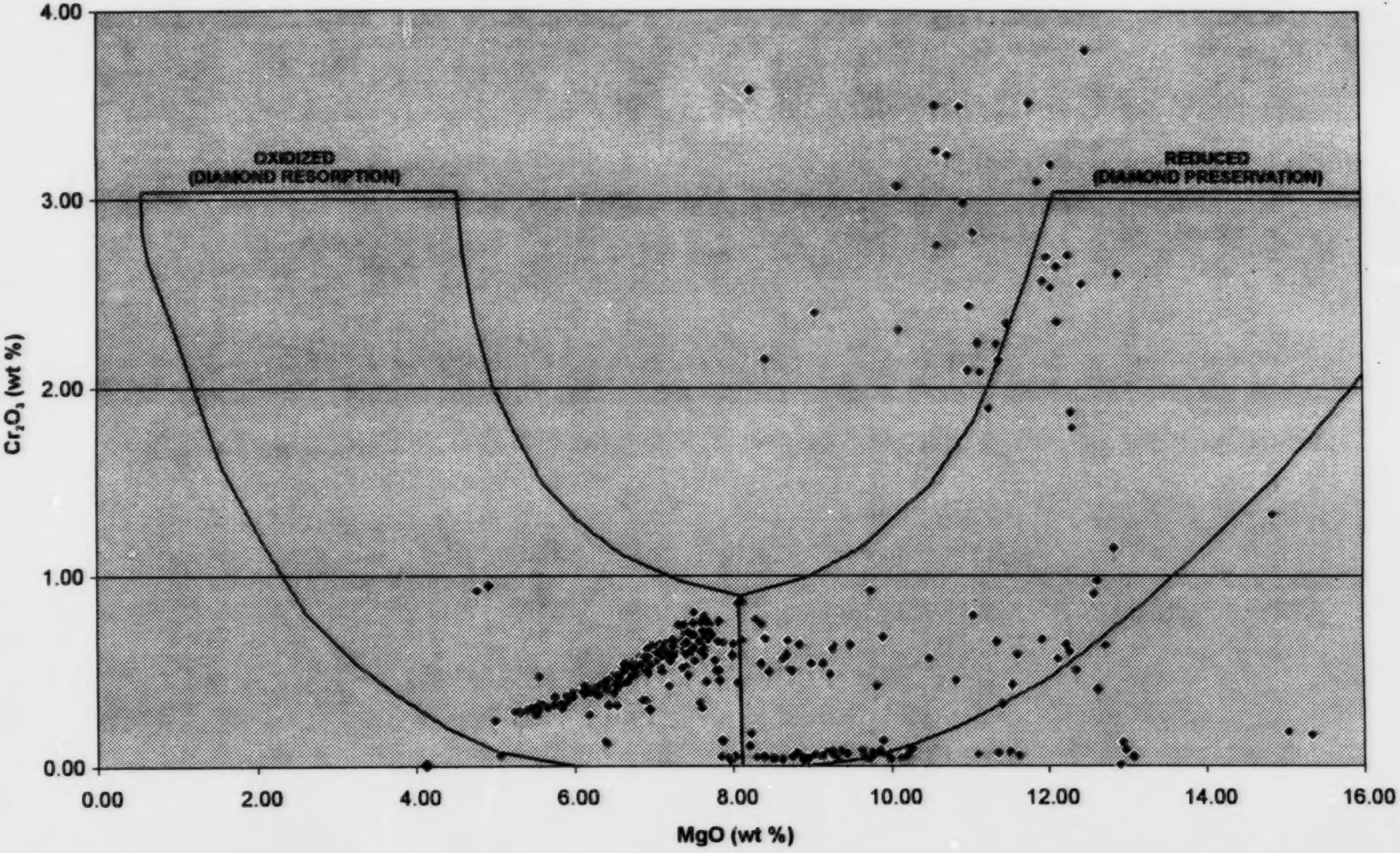


Figure 15. Mg-ilmenite Cr_2O_3-MgO plot (diagram after Gurney and Moore 1991). The values presented here are from microprobe data derived from Mg-Ilmenites submitted to the Ontario Geoscience Laboratory.

Sample #	Number of Grains per Sample				Sample #	Number of Grains per Sample			
Number	Reduced	Oxidized	Outside	Total	Number	Reduced	Oxidized	Outside	Total
109-Ma-99	0	0	1	1	1111-Ma-99	2	5	3	10
114-Ma-99	1	0	0	1	1136-Ma-99	1	0	0	1
171-Ma-99	3	2	3	8	1248-Ma-99	0	1	0	1
189-MA-99	0	0	2	2	1260-Ma-99	1	0	0	1
208-Ma-99	0	0	1	1	1270-Ma-99	0	0	1	1
228-Ma-99	1	0	0	1	1277-Ma-99	14	89	8	111
230-Ma-99	1	0	0	1	1310-Ma-99	0	0	1	1
298-Ma-99	1	0	1	2	1327-Ma-99	7	0	4	11
307-Ma-99	1	0	0	1	1329-Ma-99	1	0	1	2
340-Ma-99	0	0	1	1	1331-Ma-99	1	0	0	1
342-Ma-99	0	0	1	1	1333-Ma-99	2	1	2	5
344-Ma-99	0	0	1	1	1345-Ma-99	0	1	0	1
357-Ma-99	1	0	1	2	6-Tm-99	1	0	0	1
377-Ma-99	3	4	0	7	158-Tm-99	0	4	1	5
379-Ma-99	7	19	2	28	185-Tm-99	0	0	1	1
381-Ma-99	0	2	0	2	452-Tm-99	1	0	0	1
383-Ma-99	1	0	1	2	497-Tm-99	1	0	1	2
420-Ma-99	3	1	0	4	1018-Tm-99	0	0	2	2
437-Ma-99	1	0	1	2	1073-Tm-99	0	1	0	1
447-Ma-99	0	0	1	1	1077-Tm-99	6	34	1	41
1028-Ma-99	0	0	1	1	1084-Tm-99	0	2	0	2
1065-Ma-99	1	1	0	2	1131-Tm-99	0	0	1	1
1075-Ma-99	0	0	1	1	1220-Tm-99	0	0	1	1
1079-Ma-99	19	75	4	98	1338-Tm-99	1	2	1	4

Table 7. Summary of reduced vs. oxidized environment for Mg-Ilmenite grains. A reduced environment is favourable for diamond preservation. The values presented in this table are based on Mg-ilmenite grains picked and submitted to the OGL for microprobe analysis.

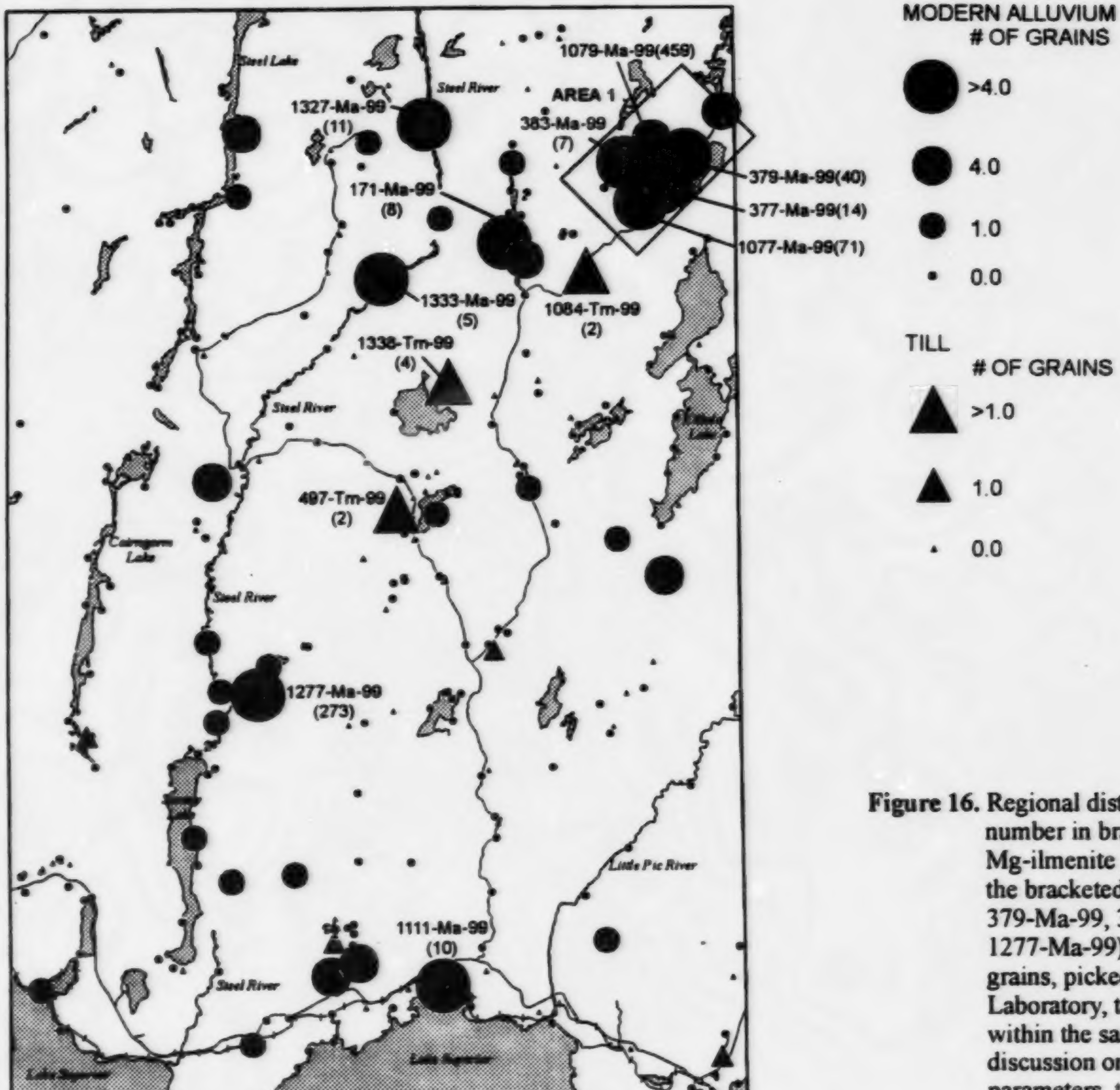

1079-Ma-99(459)
AREA 1
383-Ma-99
(7)
379-Ma-99(40)
377-Ma-99(14)
1077-Ma-99(71)
1327-Ma-99
(11)
171-Ma-99
(8)
1333-Ma-99
(5)
1084-Tm-99
(2)
1338-Tm-99
(4)
497-Tm-99
(2)
1277-Ma-99
(273)
1111-Ma-99
(10)
Steel Lake
Steel River
Steel River
Steel River
Steel River
Cairngorm Lake
Little Pic River
Lake Superior
Lake Superior
MODERN ALLUVIUM
# OF GRAINS
>4.0
4.0
1.0
0.0
TILL
# OF GRAINS
>1.0
1.0
0.0

Figure 16. Regional distribution of Mg-ilmenite grains. The number in brackets represents the number of Mg-ilmenite grains recovered from that site. Note that the bracketed number for 6 samples (377-Ma-99, 379-Ma-99, 383-Ma-99, 1077-Ma-99, 1079-Ma-99, 1277-Ma-99) is based on recalculating the number of grains, picked and submitted to the Ontario Geosciences Laboratory, to provide for an estimated number of grains within the sample's heavy mineral concentrate. For discussion on how this was done, see data plotting parameters, this report.

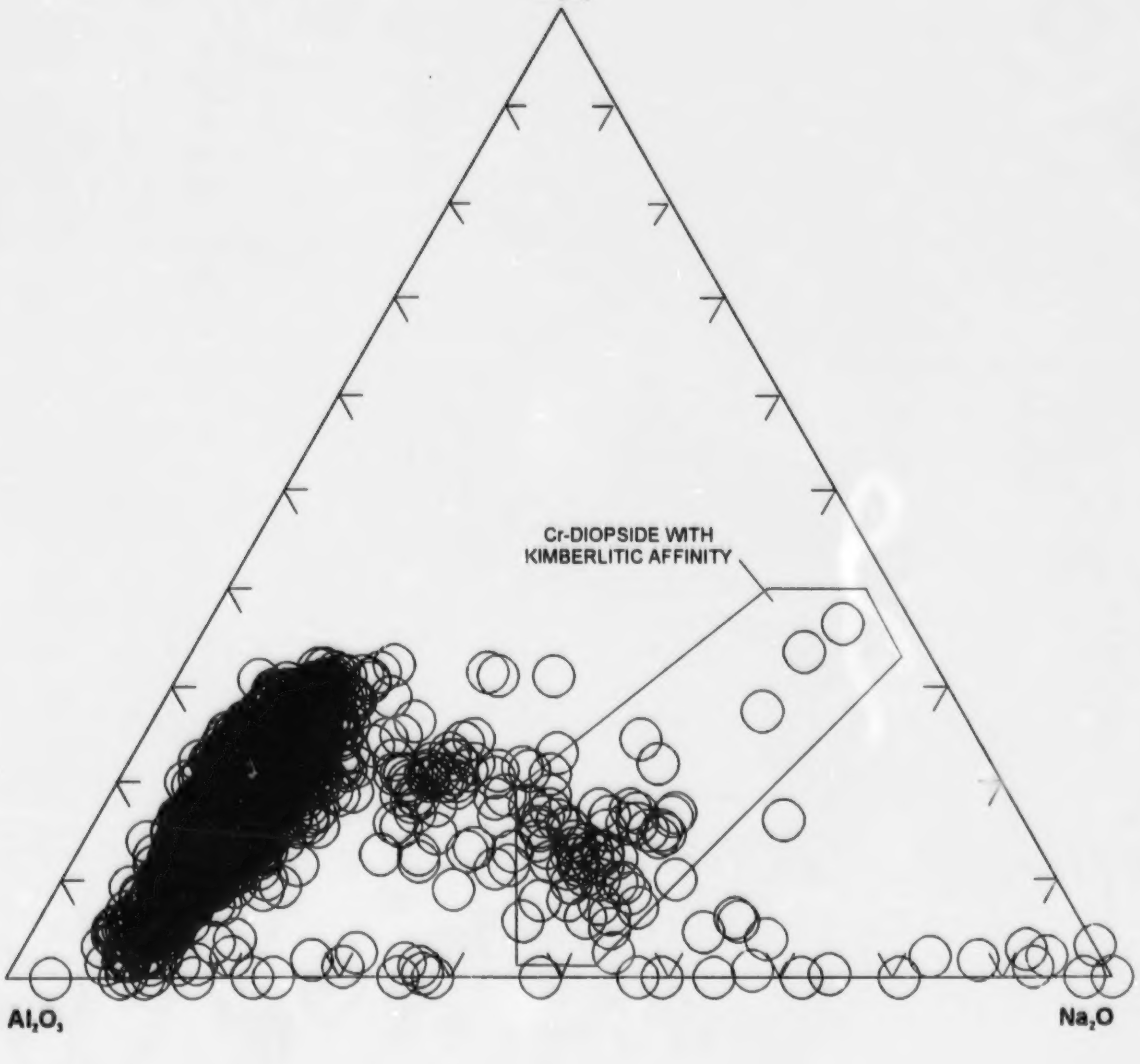


Figure 17. Ternary plot of Cr-diopside data derived from modern alluvium and till. Template defines those grains which have kimberlite affinity.

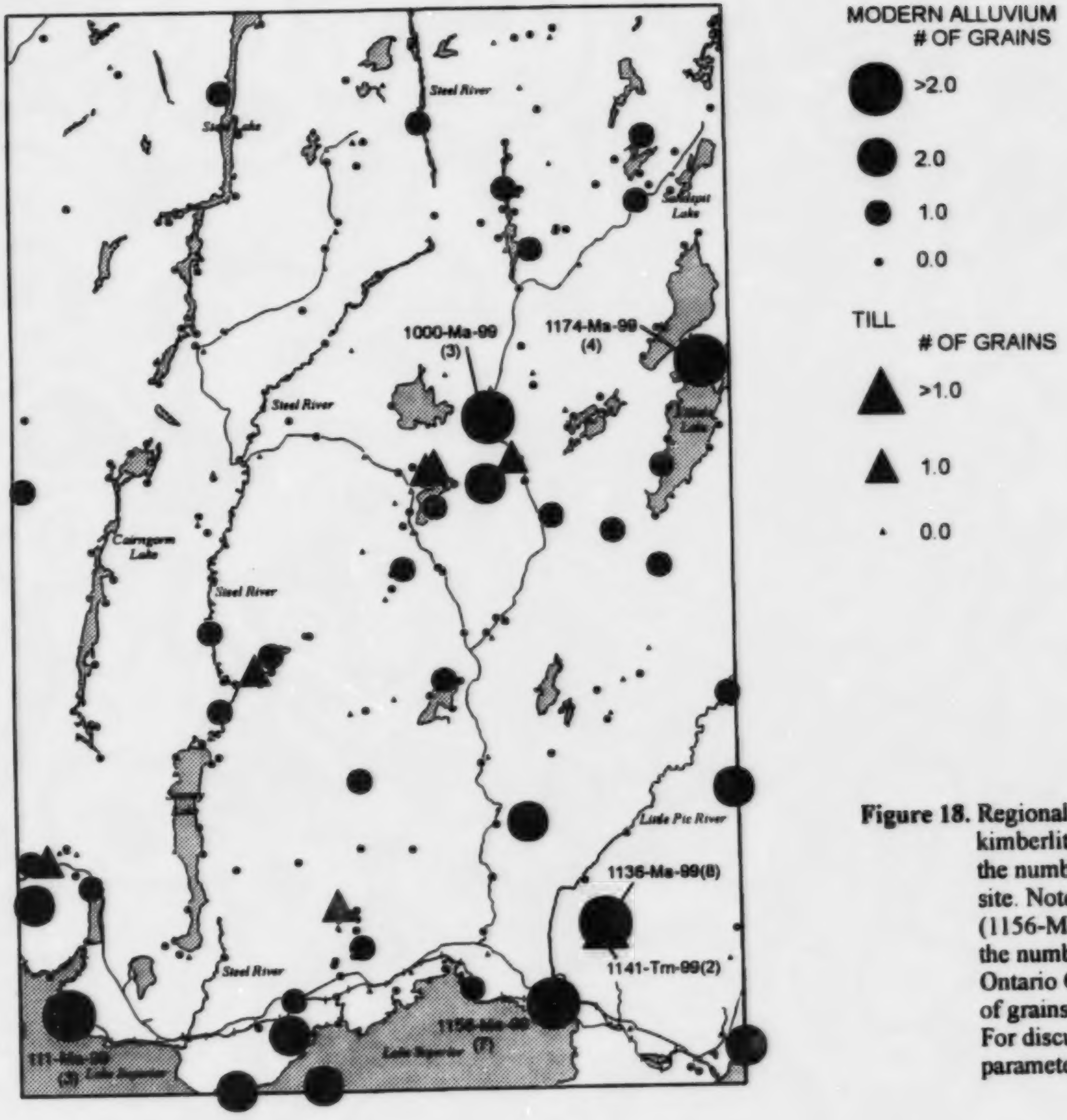

Steel River
Steel Lake
Santoy Lake
Steel River
1000-Ma-99
(3)
1174-Ma-99
(4)
Steel River
Cairngorm Lake
Steel River
Little Pic River
1136-Ma-99(8)
1141-Tm-99(2)
Steel River
1156-Ma-99
(7)
Lake Superior
111-Ma-99
(3)
Lake Superior
MODERN ALLUVIUM
# OF GRAINS
>2.0
2.0
1.0
0.0
TILL
# OF GRAINS
>1.0
1.0
0.0

Figure 18. Regional distribution of Cr-diopside grains of kimberlitic affinity. The number in brackets represents the number of Cr-diopside grains recovered from that site. Note that the bracketed number for 2 samples (1156-Ma-99, 1174-Ma-99) is based on recalculating the number of grains picked and submitted to the Ontario Geoscience Laboratory to an estimated number of grains within the sample's heavy mineral concentrate. For discussion on how this was done, see data plotting parameter, this report.

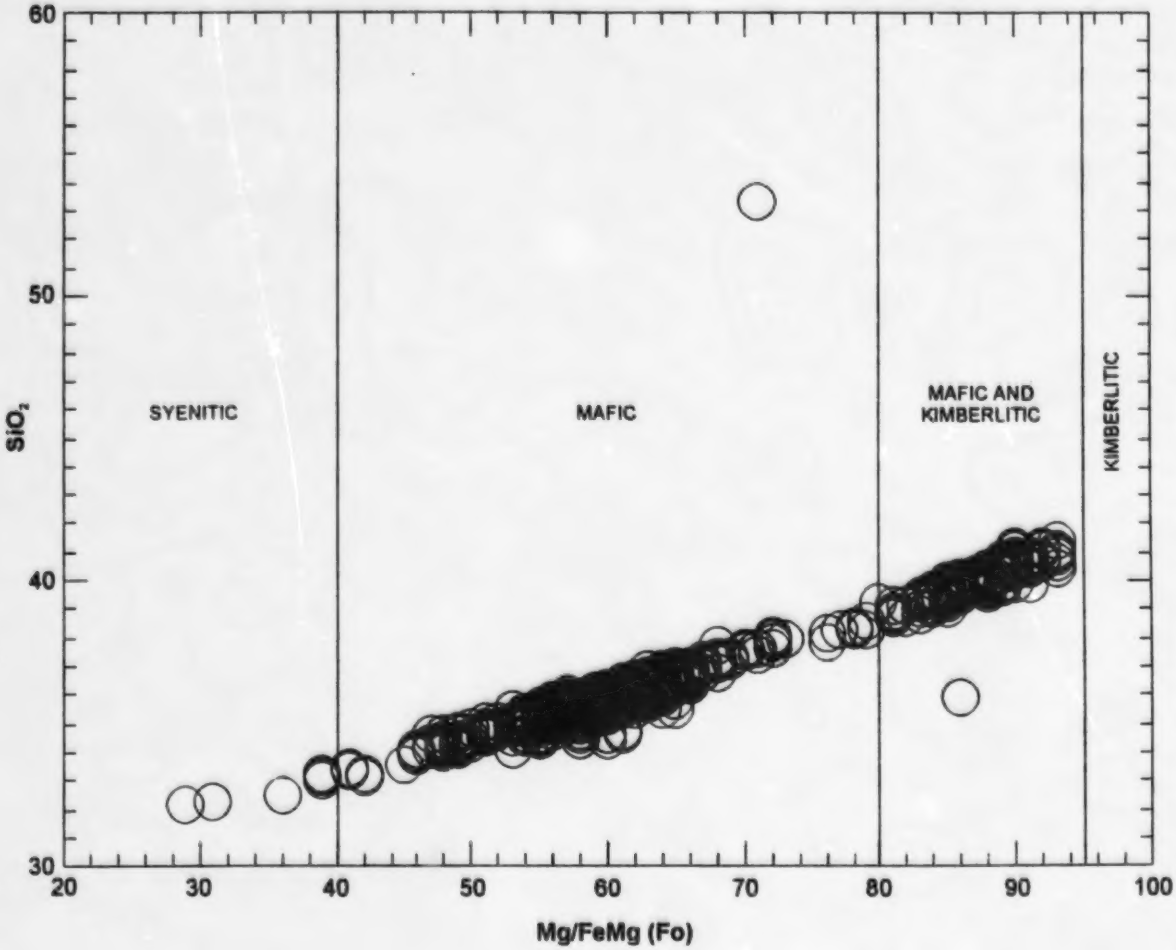


Figure 19. Binary plot of olivine data derived from modern alluvium and till. The 4 subdivisions presented here are based upon similar analysis on olivine derived from kimberlite, gabbro and syenite bedrock samples elsewhere in Ontario. See text for details.

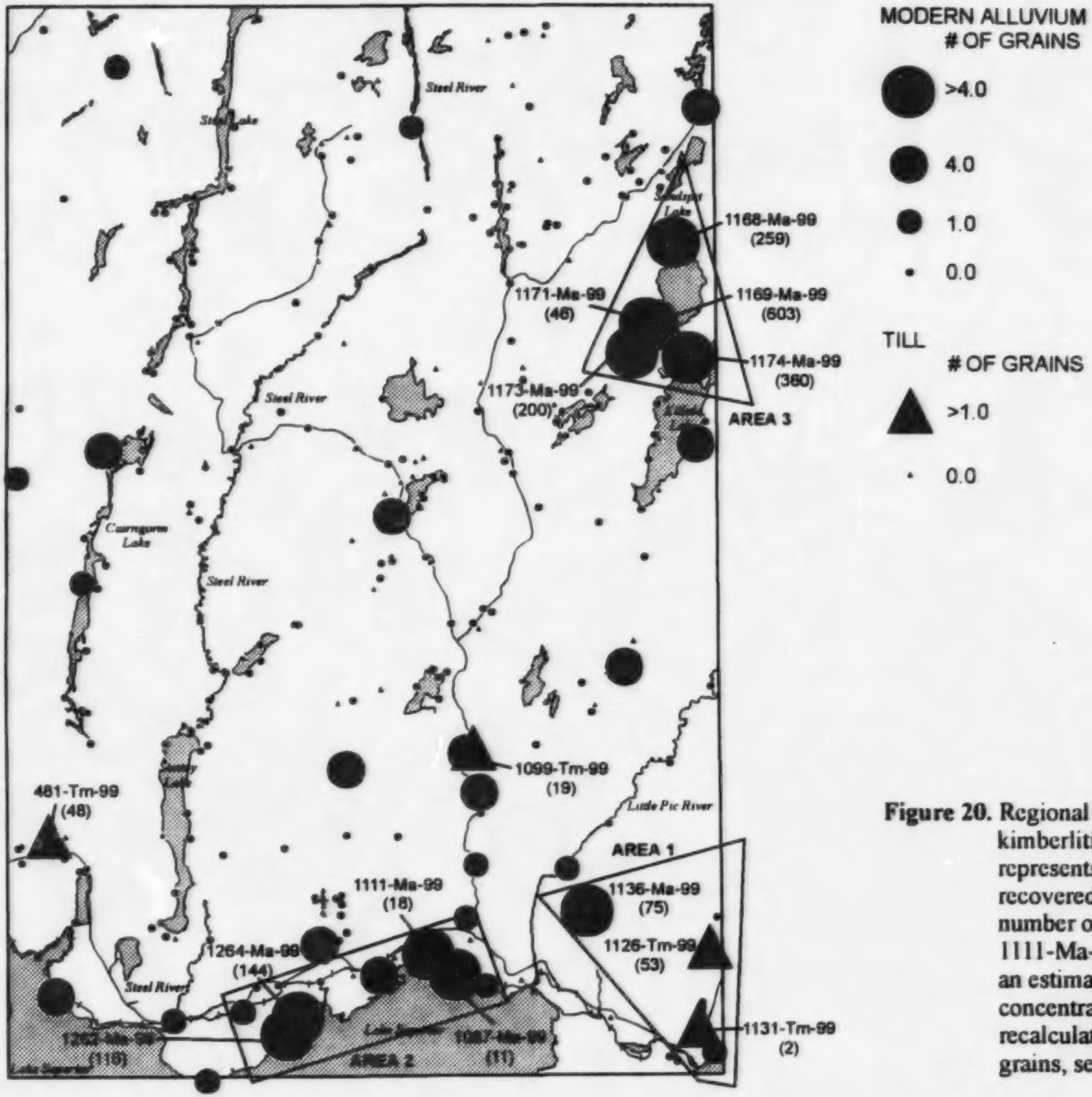

Steel River
Steel Lake
Steel River
Steel River
Cairngorm Lake
Steel River
Little Pic River
Steel River
Lake Superior
1168-Ma-99
(259)
1171-Ma-99
(46)
1169-Ma-99
(603)
1174-Ma-99
(360)
1173-Ma-99
(200)
AREA 3
1099-Tm-99
(19)
481-Tm-99
(48)
AREA 1
1136-Ma-99
(75)
1126-Tm-99
(53)
1131-Tm-99
(2)
1111-Ma-99
(18)
1264-Ma-99
(144)
1087-Ma-99
(11)
1262-Ma-99
(116)
AREA 2
MODERN ALLUVIUM
# OF GRAINS
>4.0
4.0
1.0
0.0
TILL
# OF GRAINS
>1.0
0.0

Figure 20. Regional distribution of olivine grains with mafic-kimberlitic affinity. The number in brackets represents the estimated number of olivine grains recovered from that site. Note that the bracketed number of 4 samples (481-Tm-99, 1087-Ma-99, 1111-Ma-99, 1136-Ma-99) were not recalculated to an estimated numbers of grains in the sample concentrate. For discussion on how values were recalculated to account for estimated number of grains, see data plotting parameter section, this report.

Recommendations for Kimberlite Exploration

In examining the distribution and compositions of individual KIMs, several sites and related areas were identified as favourable for kimberlite exploration. However, by considering the total number of KIMs at each site, fewer exploration targets of higher quality can be recommended. This may be more desirable in that the recommended exploration areas are based on sample sites containing significant KIMs (e.g., a "G10") or a variety of KIMs (e.g., a "G10", Mg-ilmenite and chromite). Seven areas and 6 sites are proposed for kimberlite exploration (Figure 21)(Table 8). Note that some of the values used to determine anomalous sites were recalculated to account for an estimated number of grains within the heavy mineral concentrate of some samples. These samples have been highlighted within the discussion of the individual KIMs and within Table 8.

Determining proximity of a KIM signature to source is difficult in this terrane. As discussed previously, the use of pebble data is not recommended as many pebble lithologies may be derived from one rock type. Therefore, it is important to evaluate the properties of the local overburden cover, proximity to structures associated with the TSTZ and any geophysical data that may be available. For example, in the upper Little Pic River area, 2 G10s and a Type I Eclogite garnet were recovered from modern alluvium samples. Although the river has incised to bedrock, it cuts through medium textured sand associated with glaciolacustrine deposition. No pebbles were derived from these samples. This type of glacial deposit often consists of some distally derived materials and therefore any heavy mineral signature recovered from materials associated with this type of deposit may not have a local source.

However, although caution is warranted, the upper part of the Little Pic River area may be a good place to explore for kimberlite for several reasons. These include: 1) there are not one, but 3 sites that have a strong KIM signature while other sites around them do not; 2) each site consists of more than one KIM type; 3) the river does cut to bedrock; 4) all 3 sites are located at a major intersection between structures associated with the TSTZ and the Killala Lake Deformation Zone; and 5) there are a number of magnetic anomalies (bull's-eyes) immediately up-ice from the sites as illustrated on magnetic maps (Geological Survey of Canada 1963)

Metamorphic or Magmatic Massive Sulphide Indicator Minerals

The number and types of MMSIMs picked and observed within the samples is summarized in Morris (2000, Appendix A-9). Oxide data of the olivine, low Cr-diopsides, chromite and gahnite is summarized in Morris (2000, Appendix A-9). Summary statistics for each MMSIM are presented in Table 9. Note that values derived from grains picked for some MMSIMs have been recalculated to account for estimated number of grains within a samples heavy mineral concentrate.

The oxide data for all gahnite grains indicate they were derived from a Geco or Mattabi type environment, not from rare-element pegmatite. The distribution of gahnite grains is summarized in Figure 22. Note that values presented in this figure are based on the number of grains picked and submitted to the OGL for microprobe analysis.

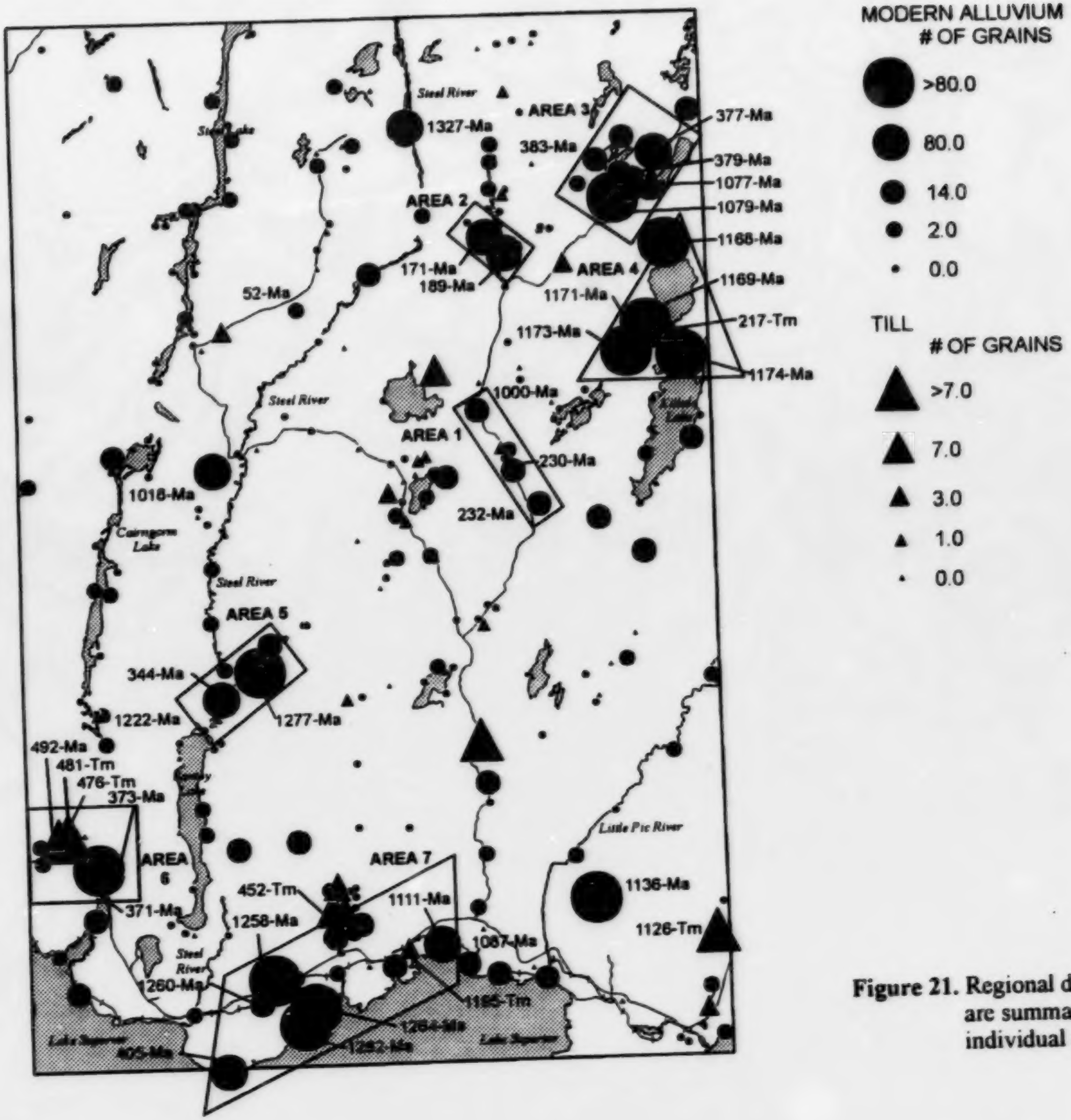

MODERN ALLUVIUM
# OF GRAINS
>80.0
80.0
14.0
2.0
0.0
TILL
# OF GRAINS
>7.0
7.0
3.0
1.0
0.0
Steel River
Steel Lake
AREA 3
1327-Ma
383-Ma
377-Ma
379-Ma
1077-Ma
1079-Ma
1168-Ma
AREA 2
171-Ma
189-Ma
AREA 4
1169-Ma
1171-Ma
52-Ma
1173-Ma
217-Tm
1174-Ma
1000-Ma
Steel River
AREA 1
230-Ma
232-Ma
1016-Ma
Cairngorm Lake
Steel River
AREA 5
344-Ma
1277-Ma
1222-Ma
492-Ma
481-Tm
476-Tm
373-Ma
AREA 6
371-Ma
Little Pic River
AREA 7
452-Tm
1111-Ma
1136-Ma
1258-Ma
1126-Tm
1087-Ma
Steel River
1260-Ma
1185-Tm
1264-Ma
Lake Superior
405-Ma
1252-Ma
Lake Superior

Figure 21. Regional distribution of total KIMs. Numbered areas are summarized in Table 8 along with significant individual areas and sites.

Area	Sample	Justification
1) Upper Little Pic River	230-Ma-99	1 G10, 1 EcI, 1 IM, 2 Cr
	232-Ma-99	1 G10, 5 G9, 1 DC
	1000-Ma-99	3 DC, 1 Cr
2) Islington Lake	171-Ma-99	2 G9, 24 Cr*, 8 IM
	189-Ma-99	2 G10, 4 G9, 1 Ec II, 3 MEG, 14 Cr*, 2 IM
3) Wellwood Lake	377-Ma-99	14 IM*
	379-Ma-99	1 MEG, 40 IM*
	383-Ma-99	1 MEG, 7 IM*
	1077-Ma-99	2 G9, 3 MEG, 71 IM*, 4 Cr
	1079-Ma-99	1 MEG, 459 IM*, 2 Cr
4) Killala Lake North	1168-Ma-99	250 Ol*
	1169-Ma-99	603 Ol*
	1171-Ma-99	46 Ol*
	1173-Ma-99	200 Ol*
	1174-Ma-99	3 G9, 4 DC*, 360 Ol*
	217-Tm-99	3 Cr
5) Larry Lake	344-Ma-99	1 DC, 1 IM, 13 Cr*
	1277-Ma-99	2 MEG, 273 IM*, 2 Cr
6) Empress Hill	371-Ma-99	1 DC, 95 Cr*
	373-Ma-99	75 Cr*
	492-Ma-99	1 Ec II, 1 DC
	476-Tm-99	8 Cr*
	481-Tm-99	48 Ol*
7) NW Shore, Ashburton Bay	405-Ma-99	2 DC, 36 Cr*, 1 Ol
	1087-Ma-99	1 DC, 11 Ol
	1111-Ma-99	10 IM, 1 KimEx, 6 Cr, 18 Ol
	1258-Ma-99	2 DC, 350 Cr*
	1260-Ma-99	1 Ec II, 1 IM, 3 Cr, 1 Ol
	1262-Ma-99	2 DC*, 15 Cr*, 116 Ol*
	1264-Ma-99	144 Ol*
	452-Tm-99	1 IM, 1847 Cr
	1195-Tm-99	3 Cr
Individual Sites	52-Ma-99	1 If-Cr, 1 Cr
	1018-Ma-99	1 MEG, 2 IM, 46 Cr*
	1136-Ma-99	8 DC, 1 IM, 75 Ol*
	1222-Ma-99	1 G10
	1327-Ma-99	1 G9, 1 DC, 11IM, 14 Cr
	1126-Tm-99	53 Ol*

G10/ G9 = Cr-pyrope garnet
Ec I/ Ec II = Eclogitic garnet
MEG = Megacrystic garnet
Cr = Chromite
If-Cr = Inclusion field chromite

KimEx = Kimberlitic chromite
DC = Cr-diopside
IM = Mg-ilmenite
Ol = Olivine

Table 8. Recommended areas for kimberlite exploration. Those values with an (*) are based on recalculating the number of grains, picked and submitted to the Ontario Geoscience Laboratories for microprobe analysis, to an estimated value of the number of grains within that sample's heavy mineral concentrate. A summary of the number of grains observed and picked per site as well as those sites with an estimated number of grains are summarized in Appendix B. Detailed discussion on how values were determined from sites with an estimated value is presented in the data plotting parameter section of this report.

Mineral	General Statistics				Percentile Statistics							
	Total Grains		Maximum per Sample Site		95th		90th		75th		50th	
	MA	Till	MA	Till	MA	Till	MA	Till	MA	Till	MA	Till
Barite*	42	0	35	0	0	0	0	0	0	0	0	0
Chalcopyrite*	144	3	26	1	3	0	2	0	0	0	0	0
Corundum	9	1	3	1	0	0	0	0	0	0	0	0
Chromite*	766	15	350	3	5	1	2	1	0	0	0	0
Cr-rutile	28	39	5	22	1	2	0	2	0	0	0	0
Fluorite	2	0	1	0	0	0	0	0	0	0	0	0
Gahnite	9	1	2	1	0	0	0	0	0	0	0	0
Galena	15	0	15	0	0	0	0	0	0	0	0	0
Grossular	2	0	1	0	0	0	0	0	0	0	0	0
Low-Cr-Diopside*	4700	182	931	20	69	9	34	9	12	4	4	1
Mn-epidote	23	2	5	1	1	0	0	0	0	0	0	0
Molybdenum	19	1	4	1	1	0	0	0	0	0	0	0
Mg-Spinel	1	0	1	0	0	0	0	0	0	0	0	0
Native Gold*	483	1213	391	1096	3	6	2	4	0	2	0	1
Olivine*	3302	763	1200	400	29	4	4	0	0	0	0	0
Pyrite*	51558	3021	30000	1500	118	50	50	27	10	9	2	0
Sapphirine	1	0	1	0	0	0	0	0	0	0	0	0
Sphalerite*	201	0	200	0	0	0	0	0	0	0	0	0
Tourmaline	2	0	2	0	0	0	0	0	0	0	0	0
Vesuvianite	1	0	1	0	0	0	0	0	0	0	0	0

Mineral	General Statistics				Percentile Statistics							
	Percentage of Grains Within Sample Mineral Concentrate		Maximum per Sample Site		95th		90th		75th		50th	
	MA	Till	MA	Till	MA	Till	MA	Till	MA	Till	MA	Till
Kyanite (%)	35.75	7.25	1	0.5	0	0	0	0	0	0	0	0
Orthopyroxene (%)	428	537	65	100	7	56	5	14	2	2	0	0
Sillimanite (%)	17.8	1.5	0.25	0.25	0	0	0	0	0	0	0	0
Spessartine (%)	13.8	14.3	4	6	0	0	0	0	0	0	0	0
Staurolite (%)	33.25	14.5	2	5	0	0	0	0	0	0	0	0

MA = Modern Alluvium

Table 9. Summary statistics for MMSIMs. An (*) indicates that the values associated with that particular MMSIM are recalculated to an estimated number of grains within a sample's heavy mineral concentrate. A summary of the number of grains observed and picked per site as well as those sites with an estimated number of grains are summarized in Appendix B. Detailed discussion on how values were determined from sites with an estimated value is presented in the data plotting parameter section of this report.

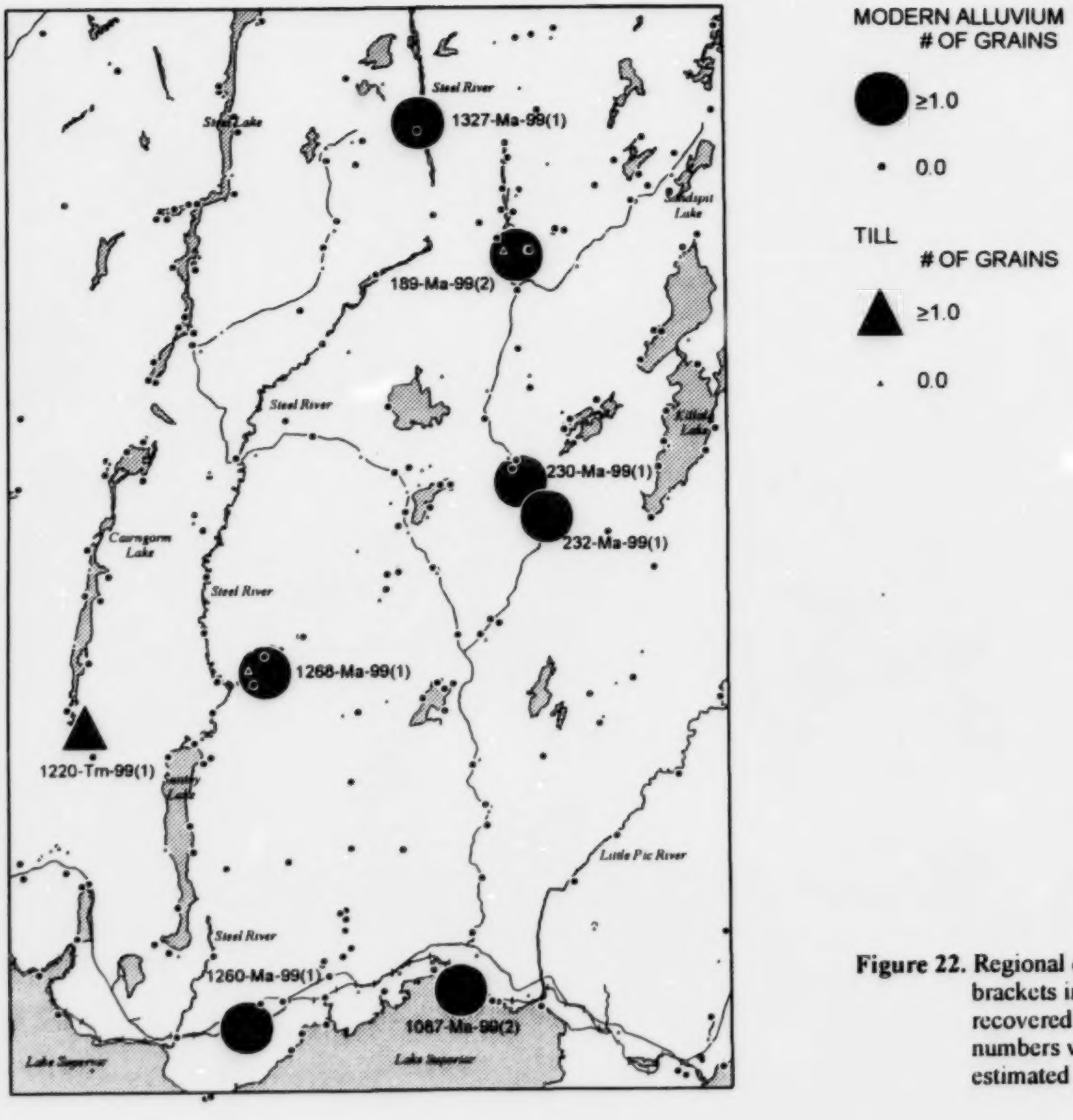

Steel River
Steel Lake
1327-Ma-99(1)
Sandspit Lake
189-Ma-99(2)
Steel River
Killala Lake
230-Ma-99(1)
232-Ma-99(1)
Cairngorm Lake
Steel River
1268-Ma-99(1)
1220-Tm-99(1)
Little Pic River
Steel River
1260-Ma-99(1)
1087-Ma-99(2)
Lake Superior
Lake Superior
MODERN ALLUVIUM
# OF GRAINS
≥1.0
0.0
TILL
# OF GRAINS
≥1.0
0.0

Figure 22. Regional distribution of gahnite grains. Value in brackets indicates the number of gahnite grains recovered from that site. Note that the bracketed numbers were not recalculated to account for an estimated number of grains in the sample concentrate.

Recommendations for Base Metal Exploration

Presenting a proportional dot diagram for each MMSIM is not practical due to the large number of individual MMSIMs. Instead, a summary MMSIM proportional dot diagram is presented. As discussed in the Data Plotting Parameters section of this report, this summary MMSIM diagram is not based on total numbers of MMSIM grains. Instead, the sites were ranked from 6 to 0 depending upon the number of anomalous (anomalous defined as > 95th percentile) MMSIMs determined for each site. For example, sample 1087-Ma-99 has the highest number of different MMSIMs, 6 (chalcopyrite, fluorite, gahnite, galena, sphalerite and spessartine) and was therefore given a ranking of 6. Site 1084-Tm-99 was given a ranking of 4 as it consisted of 4 different types of anomalous MMSIMs (molybdenite, low Cr-diopside, native gold and olivine)(*see* data plotting parameters section). Within the study area 2 areas and 3 individual sites represent potential base metal targets (Figure 23)(Table 10).

Area	**Sample**	**Justification**
1) NW Shore, Ashburton Bay	437-Ma-99	7 Ch, 4000 Py*, 1% Sp, 1% St
	1087-Ma-99	5 Ch, 1 Fl, 2 Gah, 15 Gal, 0.25% Sp, 200 Sph*
	1262-Ma-99	15 Cr*, 118 LDC*, 150 Ol*, 8% Or
2) Upper Little Pic River	230-Ma-99	3 Co, 5 Cru, 1 Gah, 2 Tou, 1 Ve
	1006-Tm-99	0.5% Ky, 13 LDC, 10 Ng
Individual Sites	1325-Ma-99	343 LDC*, 2 Mo, 1 Ms, 10% Or
	1327-Ma-99	1 Co, 17 Cr, 2 Cru, 1 Gah, 0.25% Sp
	1084-Tm-99	1 Mo, 12 LDC, 7 Ng, 10 Ol

Ch = Chalcopyrite
Cr = Chromite
Cru = Cr-rutile
Co = Corundum
Fl = Fluorite
Gah = Gahnite
Gal = Galena
Ky = Kyanite
LDC = Low Cr-diopside
Mo = Molybdenite
Ms = Mg-spinel
Ng = Native Gold
Ol = Olivine
Or = Orthopyroxene
Sp = Spessartine
Sph = Sphalerite
Tou = Tourmaline
Ve = Vesuvianite

Table 10. Recommended areas for base metal exploration. Those values with an (*) are based on recalculating the number of grains, picked and submitted to the Ontario Geoscience Laboratories for microprobe analysis, to an estimated value of the number of grains within that sample's heavy mineral concentrate. A summary of the number of grains observed and picked per site as well as those sites with an estimated number of grains are summarized in Appendix B. Detailed discussion on how these values were determined from sites with an estimated value is presented in the data plotting parameter section of this report.

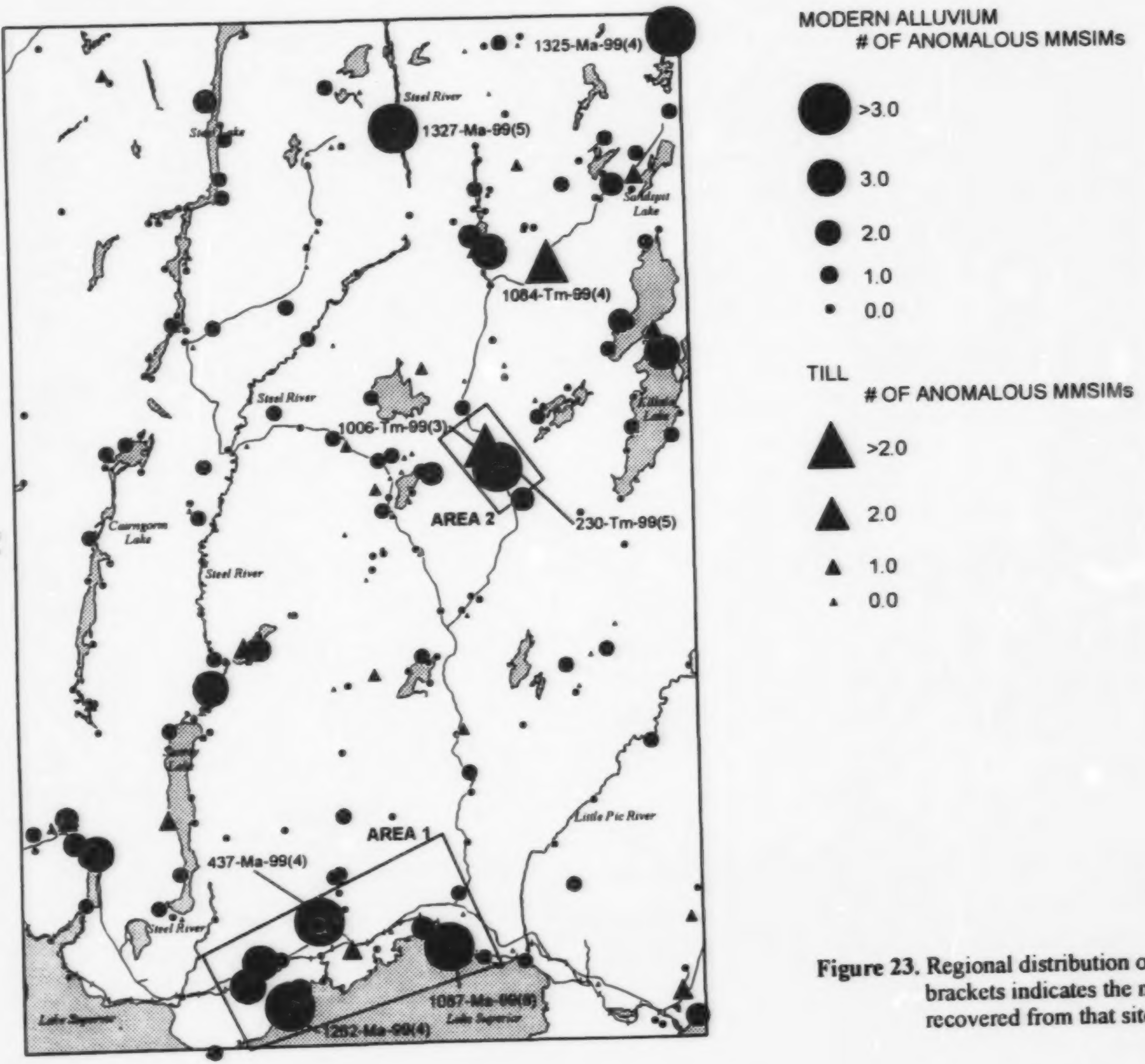

MODERN ALLUVIUM
# OF ANOMALOUS MMSIMs
>3.0
3.0
2.0
1.0
0.0
TILL
# OF ANOMALOUS MMSIMs
>2.0
2.0
1.0
0.0
1325-Ma-99(4)
1327-Ma-99(5)
1084-Tm-99(4)
1006-Tm-99(3)
230-Tm-99(5)
AREA 2
AREA 1
437-Ma-99(4)
1087-Ma-99(6)
1262-Ma-99(4)
Steel River
Steel Lake
Sandspit Lake
Cairngorm Lake
Little Pic River
Lake Superior

Figure 23. Regional distribution of MMSIM grains. Value in brackets indicates the number of anomalous MMSIMs recovered from that site.

Area 1 consists of 3 modern alluvium sample sites dispersed along the north shore of Ashburton Bay. Sample 1087-Ma-99 occurs at the mouth of Deadhorse Creek and its heavy mineral signature may reflect a local mineral occurrence. Sample 437-Ma-99 was collected from a stream that drains off the Spider Lake base metal property and the sample's base metal signature may be a reflection of that mineral deposit. There is no known mineralization in the vicinity of sample 1262-Ma-99.

Area 2 consists of a modern alluvium and a till sample in the vicinity of the upper Little Pic River. The samples were collected near a contact between migmatite and a thin unit of ultramafic rock (gabbro?).

The 3 individual sites are not associated with known mineralization. Two of the sites (1084-TM-99 and 1325-Ma-99) are associated with metasedimentary terrane. The third site (MA-1327-99) is associated with a granitic terrane but is in close proximity to a major fault.

Gold

The number of gold grains recovered in this study relative to other similar studies is very small (Bajc 1994, 1999; Bernier 1994). This is reflected in the percentile data where values defining anomalous concentrations of gold grains are very low (Table 11). Most gold grains recovered from both the till and modern alluvium samples were reshaped suggesting some distance of transport. However, one sample (63-Ma-99) had 3 pristine gold grains suggesting relative proximity to source.

Media	**General Statistics**				**Percentile Statistics**			
	Max.	Min.	Mean	Median	50th	75th	90th	95th
Modern Alluvium								
Total	8.00	0.00	0.46	0.00	0.00	0.00	2.00	3.00
Re-shaped	8.00	0.00	0.40	0.00	0.00	0.00	1.00	2.00
Modified	1.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Pristine	3.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00
Till								
Total	16.00	0.00	1.44	1.00	1.00	2.00	4.00	5.00
Re-shaped	16.00	0.00	1.31	0.00	0.00	2.00	3.00	4.00
Modified	1.00	0.00	0.08	0.00	0.00	0.00	0.00	1.00
Pristine	1.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00

Table 11. Summary statistics for gold grains. Values presented here are based on the number of grains observed.

Despite the low numbers of gold grains, there are areas where 2 or more samples contain higher numbers of gold grains relative to background values (Table 12). There are 2 areas of modest interest associated with metavolcanic terranes around the south end of Santoy Lake and near the mouth of the Prairie River (Areas 1 and 2, Figure 24).

Area	Sample	Justification
1) Santoy Lake South	54-Ma-99	3 Rs
	59-Ma-99	3 Rs
	61-Ma-99	1 Mo
	63-Ma-99	3 Pr
	65-Ma-99	4 To, 1 Mo, 1 Pr
2) Prairie River South	1248-Ma-99	3 Rs
	1253-Tm-99	1 Pr
3) Foxtrap Lake	2-Ma-99	1 Pr
	245-Ma-99	3 Rs
	1185-Tm-99	1 Pr

Area	Sample	Justification
4) Prairie Lake	18-Ma-99	1 Mo
	208-Ma-99	8 To, 8 Rs
5) Pic River North	185-Tm-99	16 To, 16 Rs
	189-Ma-99	1 Pr
	1084-Tm-99	7 To, 7 Rs
Individual Sites	198-Ma-99	5 To, 5 Rs
	315-Ma-99	5 To, 5 Rs
	1006-Tm-99	10 To, 10 Rs
	1062-Tm-99	6 To, 1 Pr
	1091-Ma-99	1 Mo
	1154-Tm-99	1 Pr

Type of Gold Grain	
To = Total	Mo = Modified
Rs = Reshaped	Pr = Pristine

Table 12. Areas or sites with modest numbers of gold grains.

Carbonatite

Heavy minerals associated with carbonatite were recovered from several samples (Table 13). Summary statistics of the carbonatite heavy minerals are presented in Table 14. Of particular interest is sample 16-Ma-99. This modern alluvium sample yielded a large number and variety of heavy minerals similar to those recovered from the Prairie Lake Carbonatite orientation survey. In addition, several other heavy mineral types, also found at the Molycorp Mountain Pass Carbonatite in northern California, were recovered. The Molycorp Mountain Pass Carbonatite is of particular interest as it is a major supplier of rare earth metals to the world and has been since the early 1950s (S. Averill, Overburden Drilling Management Limited, personal communication, 2000). Barite, synchysite and bastnaestite are the 3 important minerals associated with the California deposit which measures only 200-300 feet across.

Sample site 16-Ma-99 was re-sampled in early December (1999) in less than ideal sampling conditions (stream was ice-covered), yet despite this, a similar heavy mineral signature was obtained (sample PLMA 1, Table 13). To test whether the mineral signature of the modern alluvium samples were derived from the Prairie Lake Carbonatite, which occurs up ice, 2 bedrock samples were taken close to the sample site. The minerals derived from these bedrock samples confirmed that the modern alluvium mineral signatures were local (*see* Bedrock Heavy Mineral section) and similar to that reported from the Molycorp Mountain Pass Carbonatite.

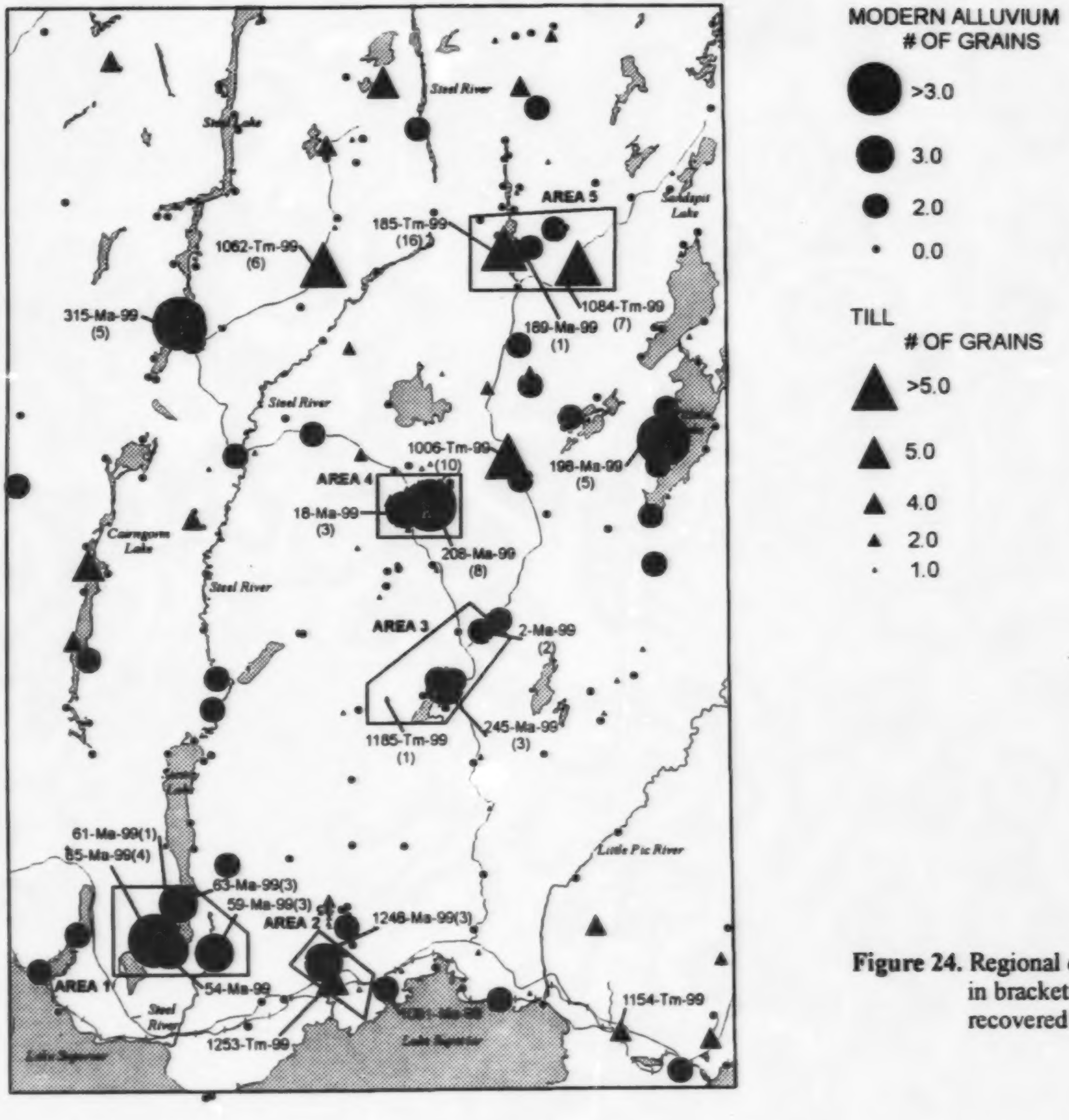

MODERN ALLUVIUM
# OF GRAINS
>3.0
3.0
2.0
0.0
TILL
# OF GRAINS
>5.0
5.0
4.0
2.0
1.0
AREA 1
AREA 2
AREA 3
AREA 4
AREA 5
Steel River
Steel Lake
Cairngorm Lake
Santoy Lake
Little Pic River
Lake Superior
315-Ma-99 (5)
1062-Tm-99 (6)
185-Tm-99 (16)
189-Ma-99 (1)
1084-Tm-99 (7)
1006-Tm-99 (10)
198-Ma-99 (5)
18-Ma-99 (3)
208-Ma-99 (8)
2-Ma-99 (2)
245-Ma-99 (3)
1185-Tm-99 (1)
61-Ma-99(1)
85-Ma-99(4)
63-Ma-99(3)
59-Ma-99(3)
54-Ma-99
1248-Ma-99(3)
1253-Tm-99
1154-Tm-99

Figure 24. Regional distribution of total gold grains. The number in brackets represents the total number of gold grains recovered from that site.

Mineral	Andradite	Augite	Augite-Hedenbergite	Augite+Fayalite	Barite	Barite+Quartz+Leucoxen	Barite+Synchysite	Basmaestite+Apatite	Diopside+Ti-Andradite	Diop.+Ti-Andra.+Per.	Hedenbergite	Ilmenite+Pyrochlore	Ilmeno-rutile	Monazite	Nb-Perovskite	Perovskite	Pyrochlore	Richterite+Calcite	Richterite+Forsterite	Rutile	Rutile-Perovskite	Synchysite	Ti-Andradite	Ti-Andradite+Feldspar	Zircon
Source																									
16-Ma-99	11	2			7		5027*	1								1	209*	1	1			1	17	1	9
25-Ma-99					35*	1																			
120-Tm-99														3											
217-Tm-99									1	6															
377-Ma-99																							1		
425-Tm-99															1	3				1	100*				
430-Tm-99																1				4	100*				
435-Tm-99																1									
442-Tm-99															3					4	22				
447-Tm-99																1				3	5				
452-Tm-99	4		4	1																			2		
457-Tm-99																3					10		1		
462-Tm-99												4				1				6	400*		3		
476-Tm-99																14									
497-Tm-99						2									2		570*			3	14				5
1126-Tm-99																	1								4
1141-Tm-99																									4
1179-Tm-99															1	1				1	13				
1220-Tm-99														8											
1315-Tm-99													9				8								3
1338-Tm-99																1									
PLMA # 1	1004*				2		65*				1			1		3	11			1					3

Table 13. Summary of carbonatite indicator minerals as derived from modern alluvium and till samples. Those values with an (*) are based on an estimate of the number of grains within a sample's heavy mineral concentrate as made by the lab. See Appendix B for a summary of observed vs. estimated grains. Reporting minerals as composites is required as minerals in samples occur as bi- and polymineralic phases.

Mineral	General Statistics			
	Total Grains		Maximum per Sample Site	
	MA	Till	MA	Till
Andradite	1015*	4	1004*	4
Augite	2	0	2	0
Augite+Fayalite	0	1	0	1
Augite-Hedenbergite	0	4	0	4
Barite	45*	0	36*	0
Barite+Quartz+Leucoxene	3	0	2	0
Barite+Synchysite	5092*	0	5027*	0
Bastnaesite+Apatite	1	0	1	0
Diopside+Ti-Andradite	0	1	0	1
Diopside+Ti-Andradite+Perovskite	0	6	0	6
Ferro-Columbite	0	1	0	1
Hedenbergite	1	0	1	0
Ilmenite+Pyrochlore	0	4	0	4
Ilmeno-Rutile	0	9	0	9
Monazite	0	12	0	8
Nb-Perovskite	0	7	0	3
Perovskite	4	26	1	14
Pyrochlore	220*	579*	209*	570*
Rutile	1	22	1	6
Rutile/Perovskite	0	664*	0	400*
Richterite+Calcite	1	0	1	0
Richterite+Forsterite	1	0	1	0
Synchysite	1	0	1	0
Ti-Andradite	18	6	17	3
Ti-Andradite+Feldspar	1	0	1	0
Zircon	12	16	9	5

MA = Modern Alluvium

Table 14. Summary of the number of grains per mineral. Those values with an (*) are based on an estimate of the number of grains within a sample's heavy mineral concentrate as made by the lab. See Appendix B for a summary of observed vs. estimated grains. Reporting minerals as composites is required as minerals in samples occur as bi- and polymineralic phases.

Recommendations for Carbonatite Exploration

When plotted on a proportional dot diagram, there are 2 areas and 1 individual sites that consist of anomalous carbonatite indicator mineral values (> 95th percentile)(Figure 25). Area 1 occurs within the vicinity of the Spider Lake base metal deposit. The heavy mineral signatures are derived from till samples collected for a base metal orientation survey (*see* Orientation Survey Section). The material sampled is thought to be locally derived as the materials are all subglacial tills and the pebble signature consists predominantly of local bedrock lithologies.

Area 2 consists of several sites south of the Prairie Lake Carbonatite and includes sample 16-Ma-99 (as previously discussed in this section)(Table 15). An individual site (sample 377-Ma-99) with an anomalous carbonatite heavy mineral signature occurs to the northeast of Area 2. It may be no coincidence that the 2 areas, the 1 individual site and the Prairie Creek Carbonatite occur along a fault system approximately where the TSTZ is interpreted to exist.

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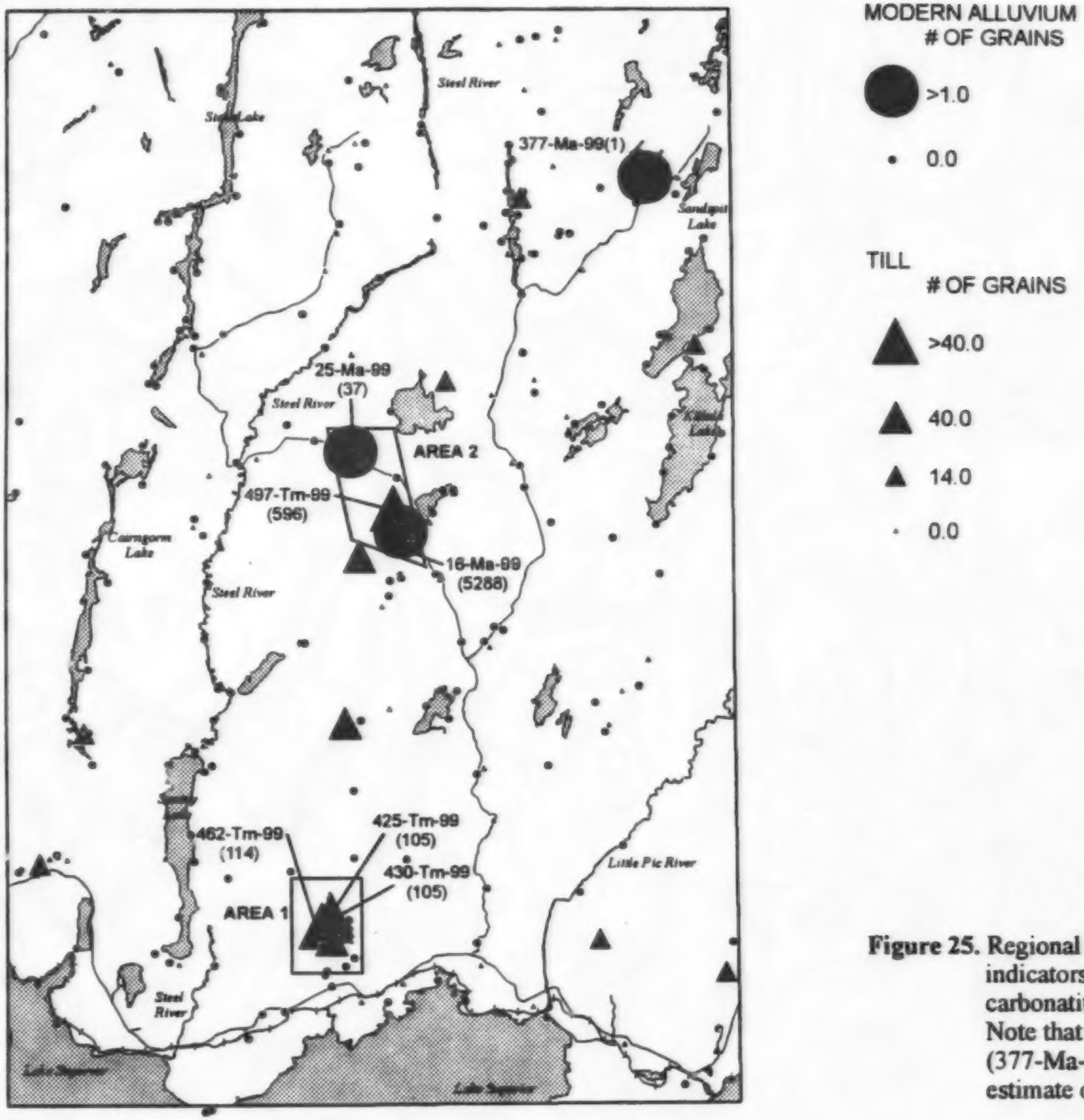
MODERN ALLUVIUM
# OF GRAINS
>1.0
0.0
TILL
# OF GRAINS
>40.0
40.0
14.0
0.0
Steel River
Steel Lake
377-Ma-99(1)
Sandspit Lake
25-Ma-99
(37)
AREA 2
497-Tm-99
(596)
16-Ma-99
(5288)
Cairngorm Lake
462-Tm-99
(114)
425-Tm-99
(105)
430-Tm-99
(105)
AREA 1
Little Pic River
Lake Superior

Figure 25. Regional distribution of carbonatite heavy mineral indicators. Value in brackets indicates the number of carbonatite indicator minerals recovered from that site. Note that the bracketed number of only one sample (377-Ma-99) is not based on a value representing an estimate of grains within a heavy mineral concentrate.

Area	Sample	Justification
1) Spider Lake Area	425-TM-99	1 Nb-Per, 3 Per, 1 Rut, 100 Rut-Per*
	430-TM-99	1Per, 4 Rut, 100 Rut-Per*
	435-TM-99	1 Per
	442-TM-99	3 Nb-Per, 4 Rut, 22 Rut-Per
	447-TM-99	1 Per, 3 Rut, 5 Rut-Per
	452-TM-99	4 And, 4 Aug-Hed, 1 Aug+Fay, 2 Ti-And+Fel
	457-TM-99	3 Per, 10 Rut-Per, 1 Ti-And
	462-TM-99	4 Ilm+Pyr, 1 Per, 6 Rut, 400 Rut-Per*, 3 Ti-And
2) Prairie Lake Area	16-Ma-99	11 And, 2 Aug, 7 Bar, 5000 Bar+Syn*, 1 Bas+Apa, 1 Per, 200 Pyr, 1 Ric+Cal, 1 Ric+For, 1 Syn, 17 Ti-And, 1 Ti-And+Fel, 9 Zir
	25-Ma-99	35 Bar*, 1 Bar+Qua+Leu
	497-TM-99	2 Bar+Qua+Leu, 2 Nb-Per, 570 Pyr*, 3 Rut, 14 Rut-Per, 5 Zir
	1315-TM-99	9 Ilm-Rut, 8 Pyr, 3 Zir
Individual Sites	377-Ma-99	1 Ti-And
	1179-Tm-99	1 Nb-Per, 1 Per, 1 Rut, 13 Rut-Per

And = Andradite
Aug = Augite
Aug-Hed = Augite-Hedenbergite
Aug-Fay = Augite-Fayalite
Bar = Barite
Bar+Qua+Leu= Barite+Quartz+Leucox
Bar+Syn= Barite+Synchysite
Bas+Apa = Bastnaestite+Apatite
Ilm+Pyr = Ilmenite+Pyrochlore
Ilm-Rut = Ilmeno-Rutile

Nb-Per = Nb-Perovskite
Per = Perovskite
Pyr = Pyrochlore
Ric+Cal = Richterite+Calcite
Ric+For = Richterite+Forsterite
Rut = Rutile
Rut+Per = Rutile+Perovskite
Syn = Synchysite
Ti-And = Ti-Andradite
Ti-And+Fel = Ti-Andradite+Feldspar
Zir = Zircon

Table 15. Recommended areas for carbonatite exploration. Those values with an (*) are based on an estimate of the number of grains within a sample's heavy mineral concentrate as made by th lab. See Appendix B for a summary of observed vs. estimated grains. Reporting minerals as composites is required as minerals in samples occur as bi- and polymineralic phases.

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APPENDIX A: Sample Site Locations

Summary of Abbreviations

Anor:	Anorthosite
Alk:	Alkalic
Car:	Carbonatite
Fv:	Felsic metavolcanic
Gab:	Gabbro
Gn:	Gneiss
Gr:	Granitic
Lamp:	Lamprophyre
Ma:	Modern alluvium
Mahminls:	Modern alluvium heavy minerals
Map:	Modern alluvium pebbles
Mas:	Modern alluvium sand
Mg:	Migmatite
Ms:	Metasedimentary
Mv:	Mafic metavolcanic
Ser:	Sericite
Syen:	Syenite
Tb:	Till "B" horizon material
Tc:	Till "C" horizon material
Th:	Humus
Tm:	Till matrix
Tms:	Till matrix sand
Um:	Ultramafic

Appendix A: Sample Site Locations

Overburden Samples

Sample Number/ Material	U.T.M.'s		Associated Bedrock	Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing			Easting	Northing	
1-Ma-99	525704	5444794	Ms	25-Mas-99	517200	5432700	Ms
1-Mahminls-99	525704	5444794	Ms	26-Map-99	517200	5432700	Ms
1-Mas-99	525704	5444794	Ms	27-Th-99	512562	5432217	Ms
2-Ma-99	523986	5423140	Mg	28-Tb-99	512562	5432217	Ms
2-Mahminls-99	523986	5423140	Mg	29-Tc-99	512562	5432217	Ms
2-Mas	523986	5423140	Mg	30-Tp-99	512562	5432217	Ms
3-Th-99	524267	5422877	Mg	31-Tm-99	512562	5432217	Ms
4-Tb-99	524267	5422877	Mg	31-Tms-99	512562	5432217	Ms
5-Tc-99	524267	5422877	Mg	32-Ma-99	515455	5433125	Ms
6-Tp-99	524267	5422877	Mg	32-Mahminls-99	515455	5433125	Ms
7-Tm-99	524267	5422877	Mg	32-Mas-99	515455	5433125	Ms
7-Tms-99	524267	5422877	Mg	33-Th-99	517304	5437538	Ms
8-Ma-99	524490	5423894	Gn	34-Tb-99	517304	5437538	Ms
8-Mahmnls-99	524490	5423894	Gn	35-Tc-99	517304	5437538	Ms
8-Mas-99	524490	5423894	Gn	36-Tp-99	517304	5437538	Ms
9-Ma-99	524943	5423709	Gn	37-Tm-99	517304	5437538	Ms
9-Mahminls-99	524943	5423709	Gn	37-Tms-99	517304	5437538	Ms
9-Mas-99	524943	5423709	Gn	38-Ma-99	513900	5433700	Ms
10-Ma-99	522837	5423116	Gn	38-Mahminls-99	513900	5433700	Ms
10-Mahminls-99	522837	5423116	Gn	38-Mas-99	513900	5433700	Ms
10-Mas-99	522837	5423116	Gn	39-Th-99	509816	5437608	Ms
11-Tm-99	520308	5428401	Ms	40-Tb-99	509816	5437608	Ms
11-Tms-99	520308	5428401	Ms	41-Tc-99	509816	5437608	Ms
12-Th-99	520308	5428401	Ms	42-Tp-99	509816	5437608	Ms
13-Tb-99	520308	5428401	Ms	43-Tm-99	509816	5437608	Ms
14-Tc-99	520308	5428401	Ms	43-Tms-99	509816	5437608	Ms
15-Tp-99	520308	5428401	Ms	44-Ma-99	509387	5437876	Ms
16-Ma-99	519801	5428694	Ms	44-Mas-99	509387	5437876	Ms
16-Mas-99	519801	5428694	Ms	45-Map-99	509387	5437876	Ms
17-Map-99	519801	5428694	Ms	46-Ma-99	510884	5438568	Ms
18-Ma-99	520149	5429416	Ms	46-Mahminls-99	510884	5438568	Ms
18-Mahminls-99	520149	5429416	Ms	46-Mas-99	510884	5438568	Ms
18-Mas-99	520149	5429416	Ms	47-Th-99	510880	5438572	Ms
19-Ma-99	519604	5431437	Ms	48-Tb-99	510880	5438572	Ms
19-Mahmnls-99	519604	5431437	Ms	49-Tc-99	510880	5438572	Ms
19-Mas-99	519604	5431437	Ms	50-Tp-99	510880	5438572	Ms
20-Tm-99	517898	5432305	Ms	51-Tm-99	510880	5438572	Ms
20-Tms-99	517898	5432305	Ms	51-Tms-99	510880	5438572	Ms
21-Th-99	517898	5432305	Ms	52-Ma-99	514841	5439596	Ms
22-Tb-99	517898	5432305	Ms	52-Mas-99	514841	5439596	Ms
23-Tc-99	517898	5432305	Ms	53-Map-99	514841	5439596	Ms
24-Tp-99	517898	5432305	Ms	54-Ma-99	508100	5406700	Mv
25-Ma-99	517200	5432700	Ms	54-Mahminls-99	508100	5406700	Mv

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing	
54-Mas-99	508100	5406700	Mv
55-Th-99	508587	5406603	Mv
56-Tb-99	508587	5406603	Mv
57-Tc-99	508587	5406603	Mv
58-Tm-99	508587	5406603	Mv
58-Tms-99	508587	5406603	Mv
59-Ma-99	510358	5406720	Mv
59-Mas-99	510358	5406720	Mv
60-Map-99	510358	5406720	Mv
61-Ma-99	508574	5409189	Mv
61-Mas-99	508574	5409189	Mv
62-Map-99	508574	5409189	Mv
63-Ma-99	508570	5410211	Fv
63-Mas-99	508570	5410211	Fv
64-Map-99	508570	5410211	Fv
65-Ma-99	507375	5407348	Mv
65-Mahminls-99	507375	5407348	Mv
65-Mas-99	507375	5407348	Mv
66-Th-99	524810	5453569	Gn
67-Tb-99	524810	5453569	Gn
68-Tc-99	524810	5453569	Gn
69-Tp-99	524810	5453569	Gn
70-Tm-99	524810	5453569	Gn
70-Tms-99	524810	5453569	Gn
71-Ma-99	525850	5453779	Gn
71-Mahmnls-99	525850	5453779	Gn
71-Mas-99	525850	5453779	Gn
72-Ma-99	526660	5453944	Gn
72-Mahmnls-99	526660	5453944	Gn
72-Mas-99	526660	5453944	Gn
73-Ma-99	527797	5454273	Gn
73-Mahmnls-99	527797	5454273	Gn
73-Mas-99	527797	5454273	Gn
74-Th-99	527663	5453815	Gn
75-Tb-99	527663	5453815	Gn
76-Tc-99	527663	5453815	Gn
77-Tp-99	527663	5453815	Gn
78-Tm-99	527663	5453815	Gn
78-Tms-99	527663	5453815	Gn
79-Th-99	527476	5447317	Gn
80-Tb-99	527476	5447317	Gn
81-Tc-99	527476	5447317	Gn
82-Tp-99	527476	5447317	Gn
83-Tm-99	527476	5447317	Gn
83-Tms-99	527476	5447317	Gn
84-Ma-99	526929	5450074	Gn
84-Mahminls-99	526929	5450074	Gn
84-Mas-99	526929	5450074	Gn
85-Th-99	526068	5451225	Gn
86-Tb-99	526068	5451225	Gn
87-Tc-99	526068	5451225	Gn
88-Tp-99	526068	5451225	Gn
89-Tm-99	526068	5451225	Gn
90-Tms-99	526068	5451225	Gn
90-Ma-99	525995	5445950	Ms
90-Mahminls-99	525995	5445950	Ms
90-Mas-99	525995	5445950	Ms
91-Th-99	507951	5412205	Gr
92-Tb-99	507951	5412205	Gr
93-Tc-99	507951	5412205	Gr
94-Tp-99	507951	5412205	Gr
95-Tm-99	507951	5412205	Gr
95-Tms-99	507951	5412205	Gr
96-Th-99	508075	5416153	Gr
97-Tb-99	508075	5416153	Gr
98-Tc-99	508075	5416153	Gr
99-Tp-99	508075	5416153	Gr
100-Tm-99	508075	5416153	Gr
100-Tms-99	508075	5416153	Gr
101-Map-99	508130	5417000	Gr
102-Ma-99	508130	5417000	Gr
102-Mas-99	508130	5417000	Gr
103-Mahminls-99	509463	5417610	Gr
104-Ma-99	509463	5417610	Gr
104-Mas-99	509463	5417610	Gr
105-Mahminls-99	510300	5416880	Gr
106-Ma-99	510300	5416880	Gr
106-Mas-99	510300	5416880	Gr
107-Mahminls-99	509930	5416582	Gr
108-Ma-99	509930	5416582	Gr
108-Mas-99	509930	5416582	Gr
109-Ma-99	501500	5405800	Gr
109-Mas-99	501500	5405800	Gr
110-Map-99	501500	5405800	Gr
111-Ma-99	502450	5403800	Gr
111-Mas-99	502450	5403800	Gr
112-Ma-99	509384	5412007	Gr
112-Mas-99	509384	5412007	Gr
113-Map-99	509384	5412007	Gr
114-Ma-99	509215	5413365	Gr

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing	
114-Mas-99	509215	5413365	Gr
115-Map-99	509215	5413365	Gr
116-Th-99	525856	5445906	Ms
117-Tb-99	525856	5445906	Ms
118-Tc-99	525856	5445906	Ms
119-Tp-99	525856	5445906	Ms
120-Tm-99	525856	5445906	Ms
120-Tms-99	525856	5445906	Ms
121-Ma-99	526500	5442600	Ms
121-Mas-99	526500	5442600	Ms
122-Map-99	526500	5442600	Ms
123-Ma-99	526400	5442900	Ms
123-Mas-99	526400	5442900	Ms
124-Map-99	526400	5442900	Ms
125-Ma-99	528100	5443800	Ms
125-Mas-99	528100	5443800	Ms
126-Mahminls-99	528100	5443800	Ms
127-Ma-99	527900	5443900	Ms
127-Mas-99	527900	5443900	Ms
128-Mahminls-99	527900	5443900	Ms
129-Ma-99	527700	5443700	Ms
129-Mas-99	527700	5443700	Ms
130-Mahminls-99	527700	5443700	Ms
131-Th-99	535697	5435897	Ms
132-Tb-99	535697	5435897	Ms
133-Tc-99	535697	5435897	Ms
134-Tp-99	535697	5435897	Ms
135-Tm-99	535697	5435897	Ms
135-Tms-99	535697	5435897	Ms
136-Ma-99	537821	5438021	Ms
136-Mas-99	537821	5438021	Ms
137-Map-99	537821	5438021	Ms
138-Ma-99	538017	5438217	Ms
138-Mas-99	538017	5438217	Ms
139-Map-99	538017	5438217	Ms
140-Th-99	536471	5436671	Ms
141-Tb-99	536471	5436671	Ms
142-Tc-99	536471	5436671	Ms
143-Tp-99	536471	5436671	Ms
144-Tm-99	536471	5436671	Ms
144-Tms-99	536471	5436671	Ms
145-Ma-99	535793	5435993	Ms
145-Mas-99	535793	5435993	Ms
146-Map-99	535793	5435993	Ms
147-Ma-99	532511	5432711	Gn
147-Mas-99	532511	5432711	Gn
148-Map-99	532511	5432711	Gn
149-Ma-99	526070	5435315	Ms
149-Mas-99	526070	5435315	Ms
150-Map-99	526070	5435315	Ms
151-Ma-99	528252	5433841	Mg
151-Mas-99	528252	5433841	Mg
152-Map-99	528252	5433841	Mg
153-Ma-99	528563	5434368	Mg
153-Mas-99	528563	5434368	Mg
154-Map-99	528563	5434368	Mg
155-Th-99	528145	5434771	Um
156-Tb-99	528145	5434771	Um
157-Tc-99	528145	5434771	Um
158-Tm-99	528145	5434771	Um
158-Tms-99	528145	5434771	Um
159-Tp-99	528145	5434771	Um
160-Ma-99	529917	5435366	Mg
160-Mas-99	529917	5435366	Mg
161-Map-99	529917	5435366	Mg
162-Ma-99	532661	5429273	Gr
162-Mas-99	532661	5429273	Gr
163-Map-99	532661	5429273	Gr
164-Th-99	533544	5430312	Gr
165-Tb-99	533544	5430312	Gr
166-Tc-99	533544	5430312	Gr
167-Tm-99	533544	5430312	Gr
167-Tms-99	533544	5430312	Gr
168-Tp-99	533544	5430312	Gr
169-Ma-99	529868	5446176	Ms
169-Mas-99	529868	5446176	Ms
170-Map-99	529868	5446176	Ms
171-Ma-99	524870	5443440	Ms
171-Mas-99	524870	5443440	Ms
172-Map-99	524870	5443440	Ms
173-Ma-99	525200	5444600	Ms
173-Mas-99	525200	5444600	Ms
173-Mahminls-99	525200	5444600	Ms
174-Ma-99	525283	5448380	Gn
174-Mas-99	525283	5448380	Gn
175-Map-99	525283	5448380	Gn
176-Ma-99	525440	5447614	Gn
176-Mas-99	525440	5447614	Gn
177-Map-99	525440	5447614	Gn
178-Ma-99	525254	5447425	Gn

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s Easting	Northing	Associated Bedrock
178-Mas-99	525254	5447425	Gn
179-Map-99	525254	5447425	Gn
180-Ma-99	525168	5446013	Ms
180-Mas-99	525168	5446013	Ms
181-Map-99	525168	5446013	Ms
182-Th-99	525198	5442824	Ms
183-Tb-99	525198	5442824	Ms
184-Tc-99	525198	5442824	Ms
185-Tm-99	525198	5442824	Ms
185-Tms-99	525198	5442824	Ms
186-Tp-99	525198	5442824	Ms
187-Ma-99	525399	5442908	Ms
187-Mas-99	525399	5442908	Ms
188-Map-99	525399	5442908	Ms
189-Ma-99	525862	5442586	Ms
189-Mas-99	525862	5442586	Ms
190-Map-99	525862	5442586	Ms
191-Ma-99	533032	5431697	Gr
191-Mas-99	533032	5431697	Gr
192-Map-99	533032	5431697	Gr
193-Th-99	533573	5432806	Gr
194-Tb-99	533573	5432806	Gr
195-Tc-99	533573	5432806	Gr
196-Tm-99	533573	5432806	Gr
196-Tms-99	533573	5432806	Gr
197-Tp-99	533573	5432806	Gr
198-Ma-99	533325	5432979	Gr
198-Mas-99	533325	5432979	Gr
199-Map-99	533325	5432979	Gr
200-Ma-99	533448	5434582	Gr
200-Mas-99	533448	5434582	Gr
200-Mahminls-99	533448	5434582	Gr
201-Ma-99	521926	5430803	Car
201-Mas-99	521926	5430803	Car
202-Map-99	521926	5430803	Car
203-Ma-99	522449	5430819	Car
203-Mas-99	522449	5430819	Car
204-Map-99	522449	5430819	Car
205-Ma-99	522475	5430669	Car
205-Mas-99	522475	5430669	Car
206-Map-99	522475	5430669	Car
207-Ma-99	521420	5429645	Car
207-Mas-99	521420	5429645	Car
208-Map-99	521420	5429645	Car
209-Th-99	521268	5429190	Mg
210-Tb-99	521268	5429190	Mg
211-Tc-99	521268	5429190	Mg
212-Tm-99	521268	5429190	Mg
212-Tms-99	521268	5429190	Mg
213-Tp-99	521268	5429190	Mg
214-Th-99	534610	5438279	Mg
215-Tb-99	534610	5438279	Mg
216-Tc-99	534610	5438279	Mg
217-Tm-99	534610	5438279	Mg
217-Tms-99	534610	5438279	Mg
218-Tp-99	534610	5438279	Mg
219-Ma-99	535371	5439031	Ms
219-Mas-99	535371	5439031	Ms
220-Map-99	535371	5439031	Ms
221-Ma-99	535063	5443617	Ms
221-Mas-99	535063	5443617	Ms
222-Map-99	535063	5443617	Ms
223-Th-99	534205	5442502	Ms
224-Tb-99	534205	5442502	Ms
225-Tc-99	534205	5442502	Ms
226-Tm-99	534205	5442502	Ms
226-Tms-99	534205	5442502	Ms
227-Tp-99	534205	5442502	Ms
228-Ma-99	530474	5428386	Gn
228-Mas-99	530474	5428386	Gn
229-Map-99	530474	5428386	Gn
230-Ma-99	526030	5430948	Mg
230-Mas-99	526030	5430948	Mg
231-Map-99	526030	5430948	Mg
232-Ma-99	527359	5429165	Gn
232-Mas-99	527359	5429165	Gn
233-Map-99	527359	5429165	Gn
234-Ma-99	521553	5426553	Mg
234-Mas-99	521553	5426553	Mg
235-Map-99	521553	5426553	Mg
236-Th-99	521763	5426312	Gn
237-Tb-99	521763	5426312	Gn
238-Tc-99	521763	5426312	Gn
239-Tm-99	521763	5426312	Gn
239-Tms-99	521763	5426312	Gn
240-Tp-99	521763	5426312	Gn
241-Ma-99	521052	5419890	Gr
241-Mas-99	521052	5419890	Gr
242-Map-99	521052	5419890	Gr
243-Ma-99	521792	5420679	Gr

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing	
243-Mas-99	521792	5420679	Gr
244-Map-99	521792	5420679	Gr
245-Ma-99	522154	5420357	Gr
245-Mas-99	522154	5420357	Gr
246-Ma-99	522600	5420636	Gr
246-Mas-99	522600	5420636	Gr
247-Ma-99	522188	5419242	Gr
247-Mas-99	522188	5419242	Gr
248-Map-99	522188	5419242	Gr
249-Ma-99	531768	5420886	Gn
249-Mas-99	531768	5420886	Gn
250-Map-99	531768	5420886	Gn
251-Ma-99	519818	5426347	Mg
251-Mas-99	519818	5426347	Mg
252-Ma-99	519777	5426473	Mg
252-Mas-99	519777	5426473	Mg
253-Ma-99	519242	5426225	Ms
253-Mas-99	519242	5426225	Ms
254-Ma-99	519188	5425454	Mg
254-Mas-99	519188	5425454	Mg
255-Th-99	518854	5424944	Mg
256-Tb-99	518854	5424944	Mg
257-Tc-99	518854	5424944	Mg
258-Tm-99	518854	5424944	Mg
258-Tms-99	518854	5424944	Mg
259-Tp-99	518854	5424944	Mg
260-Ma-99	514887	5422997	Mg
260-Mas-99	514887	5422997	Mg
261-Ma-99	514962	5423051	Gr
261-Mas-99	514962	5423051	Gr
262-Ma-99	514797	5423068	Gr
262-Mas-99	514797	5423068	Gr
263-Ma-99	530060	5418575	Gn
263-Mas-99	530060	5418575	Gn
264-Map-99	530060	5418575	Gn
265-Th-99	530244	5418963	Gn
266-Tb-99	530244	5418963	Gn
267-Tc-99	530244	5418963	Gn
268-Tm-99	530244	5418963	Gn
268-Tms-99	530244	5418963	Gn
269-Tp-99	530244	5418963	Gn
270-Ma-99	507600	5444500	Ms
270-Mas-99	507600	5444500	Ms
271-Map-99	507600	5444500	Ms
272-Ma-99	508143	5444491	Ms
272-Mas-99	508143	5444491	Ms
273-Map-99	508143	5444491	Ms
274-Ma-99	508510	5445018	Ms
274-Mas-99	508510	5445018	Ms
275-Map-99	508510	5445018	Ms
276-Ma-99	509233	5445270	Ms
276-Mas-99	509233	5445270	Ms
277-Map-99	509233	5445270	Ms
278-Ma-99	509660	5445281	Ms
278-Mas-99	509660	5445281	Ms
279-Map-99	509660	5445281	Ms
280-Ma-99	512974	5454634	Ms
280-Mas-99	512974	5454634	Ms
281-Map-99	512974	5454634	Ms
282-Th-99	512739	5454557	Ms
283-Tb-99	512739	5454557	Ms
284-Tc-99	512739	5454557	Ms
285-Tm-99	512739	5454557	Ms
285-Tms-99	512739	5454557	Ms
286-Tp-99	512739	5454557	Ms
287-Ma-99	510785	5451329	Ms
287-Mas-99	510785	5451329	Ms
288-Map-99	510785	5451329	Ms
289-Ma-99	510793	5451057	Ms
289-Mas-99	510793	5451057	Ms
290-Map-99	510793	5451057	Ms
291-Th-99	511022	5450847	Ms
292-Tb-99	511022	5450847	Ms
293-Tc-99	511022	5450847	Ms
294-Tm-99	511022	5450847	Ms
294-Tms-99	511022	5450847	Ms
295-Tp-99	511022	5450847	Ms
296-Ma-99	511550	5449770	Ms
296-Mas-99	511550	5449770	Ms
297-Map-99	511550	5449770	Ms
298-Ma-99	511742	5448957	Ms
298-Mas-99	511742	5448957	Ms
299-Map-99	511742	5448957	Ms
300-Th-99	511435	5446816	Ms
301-Tb-99	511435	5446816	Ms
302-Tc-99	511435	5446816	Ms
303-Tm-99	511435	5446816	Ms
303-Tms-99	511435	5446816	Ms
304-Tp-99	511435	5446816	Ms
305-Ma-99	511435	5446816	Ms

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s		Associated Bedrock	Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing			Easting	Northing	
305-Mas-99	511435	5446816	Ms	340-Ma-99	509949	5423272	Gr
306-Map-99	511435	5446816	Ms	341-Map-99	509949	5423272	Gr
307-Ma-99	511550	5445786	Ms	342-Ma-99	510610	5420774	Gr
307-Mas-99	511550	5445786	Ms	343-Map-99	510610	5420774	Gr
308-Map-99	511550	5445786	Ms	344-Ma-99	510392	5419203	Gr
309-Ma-99	507157	5436281	Ms	345-Map-99	510392	5419203	Gr
309-Mas-99	507157	5436281	Ms	346-Ma-99	529568	5420072	Gn
310-Map-99	507157	5436281	Ms	347-Th-99	530905	5420659	Gn
311-Ma-99	507525	5436155	Ms	348-Tb-99	530905	5420659	Gn
311-Mas-99	507525	5436155	Ms	349-Tc-99	530905	5420659	Gn
312-Map-99	507525	5436155	Ms	350-Tm-99	530905	5420659	Gn
313-Ma-99	507428	5437214	Ms	351-Tp-99	530905	5420659	Gn
313-Mas-99	507428	5437214	Ms	352-Th-99	532230	5422258	Gr
314-Map-99	507428	5437214	Ms	353-Tb-99	532230	5422258	Gr
315-Ma-99	508702	5438800	Ms	354-Tc-99	532230	5422258	Gr
315-Mas-99	508702	5438800	Ms	355-Tm-99	532230	5422258	Gr
316-Map-99	508702	5438800	Ms	356-Tp-99	532230	5422258	Gr
317-Ma-99	509464	5438691	Ms	357-Ma-99	532819	5426563	Gr
317-Mas-99	509464	5438691	Ms	358-Map-99	532819	5426563	Gr
318-Map-99	509464	5438691	Ms	359-Ma-99	516286	5405177	Ms
319-Ma-99	509021	5439520	Ms	360-Map-99	516286	5405177	Ms
319-Mas-99	509021	5439520	Ms	361-Ma-99	516221	5405643	Ms
320-Map-99	509021	5439520	Ms	362-Ma-99	500741	5410713	Mv
321-Ma-99	508414	5442031	Gn	363-Map-99	500741	5410713	Mv
321-Mas-99	508414	5442031	Gn	364-Th-99	502993	5412130	Fv
322-Map-99	508414	5442031	Gn	365-Tb-99	502993	5412130	Fv
323-Ma-99	509560	5441894	Gn	366-Tc-99	502993	5412130	Fv
323-Mas-99	509560	5441894	Gn	367-Tm-99	502993	5412130	Fv
324-Map-99	509560	5441894	Gn	368-Tp-99	502993	5412130	Fv
325-Th-99	509765	5442599	Gn	369-Ma-99	502912	5410986	Mv
326-Tb-99	509765	5442599	Gn	370-Map-99	502912	5410986	Mv
327-Tc-99	509765	5442599	Gn	371-Ma-99	503700	5410300	Gr
328-Tm-99	509765	5442599	Gn	372-Map-99	503700	5410300	Gr
328-Tms-99	509765	5442599	Gn	373-Ma-99	504060	5410439	Mv
329-Tp-99	509765	5442599	Gn	374-Map-99	504060	5410439	Mv
330-Ma-99	505670	5452137	Ms	375-Ma-99	504350	5409525	Gr
331-Th-99	505264	5452580	Ms	376-Map-99	504350	5409525	Gr
332-Tc-99	505264	5452580	Ms	377-Ma-99	532127	5446727	Ms
333-Tm-99	505264	5452580	Ms	378-Map-99	532127	5446727	Ms
334-Tp-99	505264	5452580	Ms	379-Ma-99	533926	5447821	Ms
335-Ma-99	501880	5454070	Gn	380-Map-99	533926	5447821	Ms
336-Th-99	509855	5417925	Gr	381-Ma-99	532255	5448668	Ms
337-Tc-99	509855	5417925	Gr	382-Map-99	532255	5448668	Ms
338-Tm-99	509855	5417925	Gr	383-Ma-99	530848	5447455	Ms
339-Tp-99	509855	5417925	Gr	384-Map-99	530848	5447455	Ms

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing	
385-Th-99	521425	5431817	Alk
386-Tb-99	521425	5431817	Alk
387-Tc-99	521425	5431817	Alk
388-Tm-99	521425	5431817	Alk
389-Tp-99	521425	5431817	Alk
390-Th-99	521006	5431595	Alk
391-Tb-99	521006	5431595	Alk
392-Tc-99	521006	5431595	Alk
393-Tm-99	521006	5431595	Alk
394-Tp-99	521006	5431595	Alk
395-Th-99	520854	5430833	Alk
396-Tb-99	520854	5430833	Alk
397-Tc-99	520854	5430833	Alk
398-Tm-99	520854	5430833	Alk
399-Tp-99	520854	5430833	Alk
400-Th-99	520253	5430510	Alk
401-Tb-99	520253	5430510	Alk
402-Tc-99	520253	5430510	Alk
403-Tm-99	520253	5430510	Alk
404-Tp-99	520253	5430510	Alk
409-Ma-99	503451	5407640	Gr
410-Map-99	503451	5407640	Gr
405-Ma-99	510175	5399461	Gab
406-Map-99	510175	5399461	Gab
407-Ma-99	509886	5399355	Gab
408-Map-99	509886	5399355	Gab
409-Ma-99	503451	5407640	Gr
410-Map-99	503451	5407640	Gr
411-Ma-99	516814	5408860	Mv
412-Map-99	516814	5408860	Mv
413-Ma-99	516085	5408841	Mv
414-Map-99	516085	5408841	Mv
415-Ma-99	515757	5408904	Mv
416-Map-99	515757	5408904	Mv
417-Ma-99	517094	5409013	Mv
418-Ma-99	517108	5408556	Mv
419-Ma-99	517057	5407983	Fv
420-Ma-99	517355	5407086	Ms
421-Map-99	517355	5407086	Ms
422-Th-99	516172	5409326	Fv
423-Tb-99	516172	5409326	Fv
424-Tc-99	516172	5409326	Fv
425-Tm-99	516172	5409326	Fv
426-Tp-99	516172	5409326	Fv
427-Th-99	516131	5409048	Fv

Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing	
428-Tb-99	516131	5409048	Fv
429-Tc-99	516131	5409048	Fv
430-Tm-99	516131	5409048	Fv
431-Tp-99	516131	5409048	Fv
432-Th-99	516281	5408885	Fv
433-Tb-99	516281	5408885	Fv
434-Tc-99	516281	5408885	Fv
435-Tm-99	516281	5408885	Fv
436-Tp-99	516281	5408885	Fv
437-Ma-99	515968	5406427	Mv
438-Map-99	515968	5406427	Mv
439-Th-99	516187	5408731	Fv
440-Tb-99	516187	5408731	Fv
441-Tc-99	516187	5408731	Fv
442-Tm-99	516187	5408731	Fv
443-Tp-99	516187	5408731	Fv
444-Th-99	516167	5408491	Fv
445-Tb-99	516167	5408491	Fv
446-Tc-99	516167	5408491	Fv
447-Tm-99	516167	5408491	Fv
448-Tp-99	516167	5408491	Fv
449-Th-99	516134	5408171	Fv
450-Tb-99	516134	5408171	Fv
451-Tc-99	516134	5408171	Fv
452-Tm-99	516134	5408171	Fv
453-Tp-99	516134	5408171	Fv
454-Th-99	516226	5408070	Fv
455-Tb-99	516226	5408070	Fv
456-Tc-99	516226	5408070	Fv
457-Tm-99	516226	5408070	Fv
458-Tp-99	516226	5408070	Fv
459-Th-99	515748	5408757	Fv
460-Tb-99	515748	5408757	Fv
461-Tc-99	515748	5408757	Fv
462-Tm-99	515748	5408757	Fv
463-Tp-99	515748	5408757	Fv
464-Ma-99	516935	5406659	Ms
465-Map-99	516935	5406659	Ms
466-Ma-99	501638	5411791	Mv
467-Map-99	501638	5411791	Mv
468-Th-99	501518	5411772	Mv
469-Tb-99	501518	5411772	Mv
470-Tc-99	501518	5411772	Mv
471-Tm-99	501518	5411772	Mv
472-Tp-99	501518	5411772	Mv

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing	
473-Th-99	501633	5411918	Mv
474-Tb-99	501633	5411918	Mv
475-Tc-99	501633	5411918	Mv
476-Tm-99	501633	5411918	Mv
477-Tp-99	501633	5411918	Mv
478-Th-99	502137	5412198	Fv
479-Tb-99	502137	5412198	Fv
480-Tc-99	502137	5412198	Fv
481-Tm-99	502137	5412198	Fv
482-Tp-99	502137	5412198	Fv
483-Ma-99	502491	5412367	Fv
484-Map-99	502491	5412367	Fv
485-Th-99	502545	5412302	Fv
486-Tb-99	502545	5412302	Fv
487-Tc-99	502545	5412302	Fv
488-Tm-99	502545	5412302	Fv
489-Tp-99	502545	5412302	Fv
490-Ma-99	500558	5411492	Fv
491-Map-99	500558	5411492	Fv
492-Ma-99	500665	5411589	Fv
493-Map-99	500665	5411589	Fv
494-Th-99	519421	5429926	Ms
495-Tb-99	519421	5429926	Ms
496-Tc-99	519421	5429926	Ms
497-Tm-99	519421	5429926	Ms
498-Tp-99	519421	5429926	Ms
1000-Ma-99	524200	5434200	Ms
1000-Mas-99	524200	5434200	Ms
1001-Map-99	524200	5434200	Ms
1002-Th-99	525400	5432200	Mg
1003-Tb-99	525400	5432200	Mg
1004-Tc-99	525400	5432200	Mg
1005-Tp-99	525400	5432200	Mg
1006-Tm-99	525400	5432200	Mg
1006-Tms-99	525400	5432200	Mg
1007-Ma-99	525800	5432050	Mg
1007-Mas-99	525800	5432050	Mg
1008-Map-99	525800	5432050	Mg
1009-Ma-99	525600	5431600	Mg
1009-Mas-99	525600	5431600	Mg
1010-Map-99	525600	5431600	Mg
1011-Ma-99	509890	5428508	Ms
1011-Mas-99	509890	5428508	Ms
1012-Map-99	509890	5428508	Ms
1013-Th-99	509400	5428950	Ms
1014-Tb-99	509400	5428950	Ms
1015-Tc-99	509400	5428950	Ms
1016-Tp-99	509400	5428950	Ms
1017-Tm-99	509400	5428950	Ms
1017-Tms-99	509400	5428950	Ms
1018-Ma-99	510222	5430296	Ms
1018-Mas-99	510222	5430296	Ms
1019-Map-99	510222	5430296	Ms
1020-Th-99	510215	5431576	Ms
1021-Tb-99	510215	5431576	Ms
1022-Tc-99	510215	5431576	Ms
1023-Tp-99	510215	5431576	Ms
1024-Tm-99	510215	5431576	Ms
1024-Tms-99	510215	5431576	Ms
1025-Ma-99	511563	5432208	Ms
1025-Mahminls-99	511563	5432208	Ms
1025-Mas-99	511563	5432208	Ms
1026-Ma-99	509456	5429329	Ms
1026-Mas-99	509456	5429329	Ms
1027-Map-99	509456	5429329	Ms
1028-Ma-99	518048	5448480	Gn
1028-Mas-99	518048	5448480	Gn
1029-Map-99	518048	5448480	Gn
1030-Th-99	517513	5448480	Gn
1031-Tb-99	517513	5448480	Gn
1032-Tc-99	517513	5448480	Gn
1033-Tp-99	517513	5448480	Gn
1034-Tm-99	517513	5448480	Gn
1034-Tms-99	517513	5448480	Gn
1035-Th-99	516186	5448149	Gn
1036-Tb-99	516186	5448149	Gn
1037-Tc-99	516186	5448149	Gn
1038-Tp-99	516186	5448149	Gn
1039-Tm-99	516186	5448149	Gn
1039-Tms-99	516186	5448149	Gn
1040-Ma-99	516202	5447452	Gn
1040-Mas-99	516202	5447452	Gn
1041-Map-99	516202	5447452	Gn
1042-Th-99	519094	5451446	Ms
1043-Tb-99	519094	54514460	Ms
1044-Tc-99	519094	54514460	Ms
1045-Tp-99	519094	54514460	Ms
1046-Tm-99	519094	54514460	Ms
1046-Tms-99	519094	54514460	Ms
1047-Ma-99	517221	5451683	Gn

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing	
1047-Mas-99	517221	5451683	Gn
1048-Map-99	517221	5451683	Gn
1049-Ma-99	576725	5444355	Gn
1049-Mas-99	576725	5444355	Gn
1050-Map-99	576725	5444355	Gn
1051-Th-99	516595	5443913	Ms
1052-Tb-99	516595	5443913	Ms
1053-Tc-99	516595	5443913	Ms
1054-Tp-99	516595	5443913	Ms
1055-Tm-99	516595	5443913	Ms
1055-Tms-99	516595	5443913	Ms
1056-Ma-99	516036	5443004	Ms
1056-Mas-99	516036	5443004	Ms
1057-Map-99	516036	5443004	Ms
1058-Th-99	516003	5441997	Ms
1059-Tb-99	516003	5441997	Ms
1060-Tc-99	516003	5441997	Ms
1061-Tp-99	516003	5441997	Ms
1062-Tm-99	516003	5441997	Ms
1062-Tms-99	516003	5441997	Ms
1063-Ma-99	520337	5431700	Car
1063-Mas-99	520337	5431700	Car
1064-Map-99	520337	5431700	Car
1065-Ma-99	535781	5450063	Ms
1065-Mas-99	535781	5450063	Ms
1066-Map-99	535781	5450063	Ms
1067-Ma-99	534481	5446776	Gr
1067-Mas-99	534481	5446776	Gr
1068-Map-99	534481	5446776	Gr
1069-Th-99	533785	5446721	Ms
1070-Tb-99	533785	5446721	Ms
1071-Tc-99	533785	5446721	Ms
1072-Tp-99	533785	5446721	Ms
1073-Tm-99	533785	5446721	Ms
1073-Tms-99	533785	5446721	Ms
1074-Map-99	533660	5445848	Gr
1075-Ma-99	533660	5445848	Gr
1075-Mas-99	533660	5445848	Gr
1076-Map-99	532570	5446140	Ms
1077-Ma-99	532570	5446140	Ms
1077-Mas-99	532570	5446140	Ms
1078-Map-99	531688	5445414	Ms
1079-Ma-99	531688	5445414	Ms
1079-Mas-99	531688	5445414	Ms
1080-Th-99	528952	5442048	Ms
1081-Tb-99	528952	5442048	Ms
1082-Tc-99	528952	5442048	Ms
1083-Tp-99	528952	5442048	Ms
1084-Tm-99	528952	5442048	Ms
1084-Tms-99	528952	5442048	Ms
1085-Map-99	525883	5440785	Ms
1086-Ma-99	525883	5440785	Ms
1086-Mas-99	525883	5440785	Ms
1087-Ma-99	522924	5404893	Ms
1087-Mas-99	522924	5404893	Ms
1088-Map-99	522924	5404893	Ms
1089-Ma-99	524507	5404331	Mv
1089-Mas-99	524507	5404331	Mv
1090-Map-99	524507	5404331	Mv
1091-Ma-99	524807	5404287	Mv
1091-Mas-99	524807	5404287	Mv
1092-Map-99	524807	5404287	Mv
1093-Ma-99	523582	5416445	Gr
1093-Mas-99	523582	5416445	Gr
1094-Map-99	523582	5416445	Gr
1095-Th-99	523952	5416757	Gr
1096-Tb-99	523952	5416757	Gr
1097-Tc-99	523952	5416757	Gr
1098-Tp-99	523952	5416757	Gr
1099-Tm-99	523952	5416757	Gr
1099-Tms-99	523952	5416757	Gr
1100-Ma-99	524234	5414395	Gn
1100-Mas-99	524234	5414395	Gn
1101-Map-99	524234	5414395	Gn
1102-Ma-99	523980	5444252	Gn
1102-Mas-99	523980	5444252	Gn
1103-Mahminls-99	523980	5444252	Gn
1104-Ma-99	524301	5413321	Ms
1104-Mas-99	524301	5413321	Ms
1105-Map-99	524301	5413321	Ms
1106-Th-99	524393	5414089	Gn
1107-Tb-99	524393	5414089	Gn
1108-Tc-99	524393	5414089	Gn
1109-Tm-99	524393	5414089	Gn
1109-Tms-99	524393	5414089	Gn
1110-Tp-99	524393	5414089	Gn
1111-Ma-99	521553	5405946	Ms
1111-Mas-99	521553	5405946	Ms
1112-Map-99	521553	5405946	Ms
1113-Ma-99	536294	5400891	Alk

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing	
1113-Mas-99	536294	5400891	Alk
1114-Map-99	536294	5400891	Alk
1115-Ma-99	533961	5400663	Alk
1115-Mas-99	533961	5400663	Alk
1116-Map-99	533961	5400663	Alk
1117-Ma-99	534369	5400436	Alk
1117-Mas-99	534369	5400436	Alk
1118-Map-99	534369	5400436	Alk
1119-Ma-99	535668	5403451	Alk
1119-Mas-99	535668	5403451	Alk
1120-Map-99	535668	5403451	Alk
1121-Ma-99	536427	5407867	Alk
1121-Mas-99	536427	5407867	Alk
1122-Map-99	536427	5407867	Alk
1123-Th-99	536068	5406362	Alk
1124-Tb-99	536068	5406362	Alk
1125-Tc-99	536068	5406362	Alk
1126-Tm-99	536068	5406362	Alk
1126-Tms-99	536068	5406362	Alk
1127-Tp-99	536068	5406362	Alk
1128-Th-99	535510	5402332	Alk
1129-Tb-99	535510	5402332	Alk
1130-Tc-99	535510	5402332	Alk
1131-Tm-99	535510	5402332	Alk
1131-Tms-99	535510	5402332	Alk
1132-Tp-99	535510	5402332	Alk
1133-Ma-99	528739	5410421	Alk
1133-Mas-99	528739	5410421	Alk
1134-Map-99	528739	5410421	Alk
1135-Gl-99	529237	5410320	Alk
1136-Ma-99	529753	5408204	Alk
1136-Mas-99	529753	5408204	Alk
1137-Map-99	529753	5408204	Alk
1138-Th-99	529724	5408068	Alk
1139-Tb-99	529724	5408068	Alk
1140-Tc-99	529724	5408068	Alk
1141-Tm-99	529724	5408068	Alk
1141-Tms-99	529724	5408068	Alk
1142-Tp-99	529724	5408068	Alk
1143-Gl-99	529844	5408081	Alk
1144-Gl-99	529844	5408081	Alk
1145-Gl-99	529844	5408081	Alk
1146-Gl-99	529844	5408081	Alk
1147-Gl-99	529844	5408081	Alk
1148-Gl-99	529844	5408081	Alk
1149-Gl-99	529844	5408081	Alk
1150-Gl-99	529844	5408081	Alk
1151-Th-99	530938	5402721	Alk
1152-Tb-99	530938	5402721	Alk
1153-Tc-99	530938	5402721	Alk
1154-Tm-99	530938	5402721	Alk
1154-Tms-99	530938	5402721	Alk
1155-Tp-99	530938	5402721	Alk
1156-Ma-99	527017	5404047	Alk
1156-Mas-99	527017	5404047	Alk
1157-Map-99	527017	5404047	Alk
1158-Th-99	526340	5404646	Alk
1159-Tb-99	526340	5404646	Alk
1160-Tc-99	526340	5404646	Alk
1161-Tm-99	526340	5404646	Alk
1161-Tms-99	526340	5404646	Alk
1162-Tp-99	526340	5404646	Alk
1163-Th-99	523725	5406715	Mv
1164-Tb-99	523725	5406715	Mv
1165-Tc-99	523725	5406715	Mv
1166-Tm-99	523725	5406715	Mv
1166-Tms-99	523725	5406715	Mv
1167-Tp-99	523725	5406715	Mv
1168-Ma-99	534328	5442967	Ms
1168-Mas-99	534328	5442967	Ms
1169-Ma-99	533242	5438654	Ms
1169-Mas-99	533242	5438654	Ms
1170-Map-99	533242	5438654	Ms
1171-Ma-99	532856	5438717	Ms
1171-Mas-99	532856	5438717	Ms
1172-Map-99	532856	5438717	Ms
1173-Ma-99	532163	5437217	Ms
1173-Mas-99	532163	5437217	Ms
1174-Ma-99	535064	5436971	Mg
1174-Mas-99	535064	5436971	Mg
1175-Ma-99	535947	5433681	Gr
1175-Mas-99	535947	5433681	Gr
1176-Th-99	516983	5419063	Ms
1177-Tb-99	516983	5419063	Ms
1178-Tc-99	516983	5419063	Ms
1179-Tm-99	516983	5419063	Ms
1179-Tms-99	516983	5419063	Ms
1180-Tp-99	516983	5419063	Ms
1181-Ma-99	517765	5419171	Gr
1181-Mas-99	517765	5419171	Gr

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s		Associated Bedrock
	Easting	Northing	
1182-Th-99	519205	5419771	Gr
1183-Tb-99	519205	5419771	Gr
1184-Tc-99	519205	5419771	Gr
1185-Tm-99	519205	5419771	Gr
1185-Tms-99	519205	5419771	Gr
1186-Tp-99	519205	5419771	Gr
1187-Gl-99	520806	5418937	Gr
1188-Ma-99	523514	5407848	Mv
1188-Mas-99	523514	5407848	Mv
1189-Map-99	523514	5407848	Mv
1190-Ma-99	524033	5410622	Ms
1190-Mas-99	524033	5410622	Ms
1192-Th-99	519800	5405814	Ms
1193-Tb-99	519800	5405814	Ms
1194-Tc-99	519800	5405814	Ms
1195-Tm-99	519800	5405814	Ms
1195-Tms-99	519800	5405814	Ms
1196-Tp-99	519800	5405814	Ms
1197-Ma-99	519025	5404855	Ms
1197-Mas-99	519025	5404855	Ms
1198-Ma-99	506869	5431098	Ms
1198-Mas-99	506869	5431098	Ms
1199-Map-99	506869	5431098	Ms
1200-Ma-99	507109	5433026	Ms
1200-Mas-99	507109	5433026	Ms
1201-Map-99	507109	5433026	Ms
1202-Ma-99	506878	5433091	Ms
1202-Mas-99	506878	5433091	Ms
1203-Map-99	506878	5433091	Ms
1204-Ma-99	506052	5432584	Ms
1204-Mas-99	506052	5432584	Ms
1205-Map-99	506052	5432584	Ms
1206-Th-99	505161	5432021	Ms
1207-Tb-99	505161	5432021	Ms
1208-Tc-99	505161	5432021	Ms
1209-Tm-99	505161	5432021	Ms
1209-Tms-99	505161	5432021	Ms
1210-Tp-99	505161	5432021	Ms
1211-Ma-99	505005	5432113	Ms
1211-Mas-99	505005	5432113	Ms
1212-Map-99	505005	5432113	Ms
1213-Ma-99	504932	5431375	Ms
1213-Mas-99	504932	5431375	Ms
1214-Map-99	504932	5431375	Ms
1215-Ma-99	504300	5416958	Gr
1215-Mas-99	504300	5416958	Gr
1216-Map-99	504300	5416958	Gr
1217-Th-99	503903	5418547	Gr
1218-Tb-99	503903	5418547	Gr
1219-Tc-99	503903	5418547	Gr
1220-Tm-99	503903	5418547	Gr
1220-Tms-99	503903	5418547	Gr
1221-Tp-99	503903	5418547	Gr
1222-Ma-99	504136	5418547	Gr
1222-Mas-99	504136	5418547	Gr
1223-Map-99	504136	5418547	Gr
1224-Ma-99	503968	5418687	Gr
1224-Mas-99	503968	5418687	Gr
1225-Map-99	503968	5418687	Gr
1226-Ma-99	502999	5419344	Mv
1226-Mas-99	502999	5419344	Mv
1227-Map-99	502999	5419344	Mv
1228-Th-99	503362	5422726	Mv
1229-Tb-99	503362	5422726	Mv
1230-Tc-99	503362	5422726	Mv
1231-Tm-99	503362	5422726	Mv
1231-Tms-99	503362	5422726	Mv
1232-Tp-99	503362	5422726	Mv
1233-Ma-99	504108	5421743	Mv
1233-Mas-99	504108	5421743	Mv
1234-Map-99	504108	5421743	Mv
1235-Ma-99	504018	5427541	Gr
1235-Mas-99	504018	5427541	Gr
1236-Map-99	504018	5427541	Gr
1237-Th-99	504139	5426612	Gr
1238-Tb-99	504139	5426612	Gr
1239-Tc-99	504139	5426612	Gr
1240-Tm-99	504139	5426612	Gr
1240-Tms-99	504139	5426612	Gr
1241-Tp-99	504139	5426612	Gr
1242-Ma-99	505116	5426137	Mv
1242-Mas-99	505116	5426137	Mv
1243-Map-99	505116	5426137	Mv
1244-Ma-99	504702	5425000	Fv
1244-Mas-99	504702	5425000	Fv
1245-Map-99	504702	5425000	Fv
1246-Ma-99	503900	5425200	Gr
1246-Mas-99	503900	5425200	Gr
1247-Map-99	503900	5425200	Gr
1248-Ma-99	515895	5406222	Ms

Overburden Samples (Continued)

Sample Number/ Material	U.T.M.'s Easting	U.T.M.'s Northing	Associated Bedrock
1248-Mas-99	515895	5406222	Ms
1249-Map-99	515895	5406222	Ms
1250-Th-99	517684	5404889	Ms
1251-Tb-99	517684	5404889	Ms
1252-Tc-99	517684	5404889	Ms
1253-Tm-99	517684	5404889	Ms
1253-Tms-99	517684	5404889	Ms
1254-Tp-99	517684	5404889	Ms
1255-Ma-99	515997	5404559	Ms
1255-Mas-99	515997	5404559	Ms
1256-Ma-99	513862	5404366	Ms
1256-Mas-99	513862	5404366	Ms
1257-Map-99	513862	5404366	Ms
1258-Ma-99	512728	5404257	Ms
1258-Mas-99	512728	5404257	Ms
1259-Map-99	512728	5404257	Ms
1260-Ma-99	512036	5403008	Ms
1260-Mas-99	512036	5403008	Ms
1261-Map-99	512036	5403008	Ms
1262-Ma-99	514289	5401838	Mv
1262-Mas-99	514289	5401838	Mv
1263-Map-99	514289	5401838	Mv
1264-Ma-99	514834	5402697	Mv
1264-Mas-99	514834	5402697	Mv
1265-Map-99	514834	5402697	Mv
1266-Ma-99	516052	5403153	Mv
1266-Mas-99	516052	5403153	Mv
1267-Map-99	516052	5403153	Mv
1268-Ma-99	513035	5421219	Gr
1269-Map-99	513035	5421219	Gr
1270-Ma-99	513010	5422048	Gr
1271-Map-99	513010	5422048	Gr
1272-Th-99	512190	5421365	Gr
1273-Tb-99	512190	5421365	Gr
1274-Tc-99	512190	5421365	Gr
1275-Tm-99	512190	5421365	Gr
1276-Tp-99	512190	5421365	Gr
1277-Ma-99	512461	5420601	Gr
1296-Ma-99	531886	5445332	Ms
1297-Map-99	531886	5445332	Ms
1298-Ma-99	508481	5402555	Um
1299-Map-99	508481	5402555	Um
1300-Rk-99	526900	5405200	Alk
1301-Rk-99	526900	5405200	Alk
1302-Rk-99	535800	5448900	Gab
1303-Rk-99	536100	5449000	Alk
1304-Ma-99	536200	5419900	Gn
1305-Ma-99	534077	5415924	Gn
1306-Map-99	534077	5415924	Gn
1307-Ma-99	530914	5412789	Gn
1308-Ma-99	527177	5416875	Gn
1309-Ma-99	517383	5412168	Gr
1310-Ma-99	511054	5411162	Gr
1311-Map-99	511054	5411162	Gr
1312-Th-99	517732	5427464	Gr
1313-Tb-99	517732	5427464	Gr
1314-Tc-99	517732	5427464	Gr
1315-Tm-99	517732	5427464	Gr
1316-Tp-99	517732	5427464	Gr
1317-Ma-99	500510	5430683	Gr
1318-Map-99	500510	5430683	Gr
1319-Ma-99	500635	5434345	Ms
1320-Map-99	500635	5434345	Ms
1321-Ma-99	502935	5445227	Ms
1322-Map-99	502935	5445227	Ms
1323-Ma-99	515970	5438089	Ms
1324-Map-99	515970	5438089	Ms
1325-Ma-99	535918	5454388	Ms
1326-Map-99	535918	5454388	Ms
1327-Ma-99	520872	5449402	Gn
1328-Map-99	520872	5449402	Gn
1329-Ma-99	520830	5448981	Gn
1330-Map-99	520830	5448981	Gn
1331-Ma-99	521626	5444653	Ms
1332-Map-99	521626	5444653	Ms
1333-Ma-99	518700	5441603	Ms
1334-Map-99	518700	5441603	Ms
1335-Th-99	522035	5436425	Ms
1336-Tb-99	522035	5436425	Ms
1337-Tc-99	522035	5436425	Ms
1338-Tm-99	522035	5436425	Ms
1339-Tp-99	522035	5436425	Ms
1340-Ma-99	519298	5434843	Ms
1341-Map-99	519298	5434843	Ms
1342-Ma-99	510064	5426139	Gr
1343-Map-99	510064	5426139	Gr
1344-Ma-99	517387	5415591	Gr
1345-Ma-99	514202	5411493	Ms
1346-Map-99	514202	5411493	Ms
1347-Ma-99	520016	5412094	Gr
PLMA#1	519801	5428694	Ms

Bedrock Samples

Sample Number/ Material	U.T.M.'s Easting	U.T.M.'s Northing	Associated Bedrock
Ashton's Lamprophyre	526900	5405200	Lamp
Sandspit Lamprophyre	532760	5445800	Lamp
Killala Anorthosite	535800	5448900	Anor
Killala Lake Syenite	536100	5449000	Syen
Cameco Shear Zone	502070	5412234	Ser
Major General Felsic Stringer Sulphide Zone	515748	5408750	Fv
Prairie Lake # 1	519600	5428604	Diorite
Prairie Lake # 2	519800	5428700	Diorite

APPENDIX B: Summary Counts of Picked and Estimated Numbers of Grains

Kimberlite Indicator Minerals

Summary of Abbreviations

CR:	Chromite
DC:	Cr-Diopside
Est.	Estimated Number of Grains
FO:	Forsteritic Olivine
GO:	Eclogite Garnet
GP:	Cr-Pyrope Garnet
IM:	Ilmenite
KIMs:	Kimberlite Indicator Minerals
Ma:	Modern Alluvium Sample
Ns:	Not Sufficient Sample
Pic.:	Picked or Counted Grains
Tm:	Till Sample

Appendix B: Kimberlite Indicator Mineral Counts: Modern Alluvium

Sample Number	Selected Pseudo KIMs				KIM Count																					
	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm								
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO	
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.
1-Ma-99	0	0	18	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
18-Ma-99	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19-Ma-99	0	0	10	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-Ma-99	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32-Ma-99	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44-Ma-99	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52-Ma-99	0	16	10	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
54-Ma-99	Ns	0	0	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61-Ma-99	0	0	4	0	0	0	0	0	0	0	0	0	0	0	C	0	0	0	0	0	0	0	0	0	0
63-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71-Ma-99	0	1	15	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104-Ma-99	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106-Ma-99	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108-Ma-99	0	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
109-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
111-Ma-99	0	1	57	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
112-Ma-99	0	2	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
114-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
121-Ma-99	0	1	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B: Kimberlite Indicator Mineral Counts: Modern Alluvium (Continued)

Sample Number	Selected Pseudo KIMs				KIM Count																				
	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm								
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO	
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.
123-Ma-99	0	4	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
125-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
127-Ma-99	Ns	0	5	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
129-Ma-99	Ns	Ns	2	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0
136-Ma-99	Ns	0	7	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
145-Ma-99	0	1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
147-Ma-99	9	70	35	1000	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0
151-Ma-99	0	3	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
153-Ma-99	Ns	0	0	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160-Ma-99	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162-Ma-99	Ns	Ns	0	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0
169-Ma-99	0	2	36	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
171-Ma-99	0	2	16	0	0	0	0	0	0	0	0	0	0	7	6	0	2	0	0	1	0	15	50	0	0
173-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
174-Ma-99	0	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
176-Ma-99	0	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
178-Ma-99	0	2	5	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	1	0	0	0	0	0	0
180-Ma-99	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
189-Ma-99	0	1	21	0	0	0	0	0	0	0	1	0	0	2	2	0	6	2	1	2	0	6	20	0	0
191-Ma-99	0	5	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
198-Ma-99	Ns	Ns	0	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0
200-Ma-99	Ns	Ns	0	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0
201-Ma-99	0	2	20	80	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
203-Ma-99	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
205-Ma-99	0	11	40	100	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
208-Ma-99	0	1	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
219-Ma-99	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
221-Ma-99	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
228-Ma-99	1	13	36	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
230-Ma-99	0	4	32	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	2	0	0	0
232-Ma-99	0	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	1	0	0	0	0	0	0
234-Ma-99	Ns	0	12	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
241-Ma-99	Ns	Ns	0	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0

Appendix B: Kimberlite Indicator Mineral Counts: Modern Alluvium (Continued)

Sample Number	Selected Pseudo KIMs				KIM Count																					
	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm									
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO		
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.	
243-Ma-99	0	2	48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
245-Ma-99	Ns	Ns	0	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	
246-Ma-99	Ns	Ns	0	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	
247-Ma-99	Ns	0	5	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	
249-Ma-99	0	6	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
251-Ma-99	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	
252-Ma-99	Ns	Ns	1	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	
253-Ma-99	Ns	0	5	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
254-Ma-99	Ns	Ns	5	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	
261-Ma-99	Ns	Ns	1	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	
262-Ma-99	Ns	Ns	0	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	
263-Ma-99	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
270-Ma-99	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
272-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
274-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
276-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
278-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	
280-Ma-99	Ns	0	3	0	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	1	0	0	0	
287-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
289-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
296-Ma-99	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	
298-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	
305-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
307-Ma-99	0	4	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	
309-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
311-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
313-Ma-99	Ns	0	1	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
315-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
317-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
319-Ma-99	0	0	5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
321-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
323-Ma-99	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
330-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	

Appendix B: Kimberlite Indicator Mineral Counts: Modern Alluvium (Continued)

Sample Number	Selected Pseudo KIMs				KIM Count																				
	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm								
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO	
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.
335-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
340-Ma-99	0	6	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
342-Ma-99	0	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
344-Ma-99	0	4	24	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	5	15	0	0
346-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
357-Ma-99	0	6	20	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0
361-Ma-99	Ns	0	10	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
362-Ma-99	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
369-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
371-Ma-99	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	100	0	0
373-Ma-99	0	1	9	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	22	75	0	0
377-Ma-99	0	4	15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6	15	0	0	0	0
379-Ma-99	0	3	5	0	0	0	0	1	0	0	0	0	0	11	0	0	0	1	0	23	40	0	0	0	0
381-Ma-99	0	2	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
383-Ma-99	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	10	0	0	0	0
405-Ma-99	0	4	52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	40	2	0
407-Ma-99	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	21	0
409-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0
411-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
413-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
415-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
417-Ma-99	Ns	0	0	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
418-Ma-99	Ns	0	2	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
419-Ma-99	Ns	0	0	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
420-Ma-99	0	4	6	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
437-Ma-99	0	6	11	0	0	0	0	0	0	0	0	0	0	4	2	1	0	1	0	0	0	1	0	2	0
464-Ma-99	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0
466-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
483-Ma-99	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
490-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
492-Ma-99	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	29	0
1007-Ma-99	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
1011-Ma-99	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B: Kimberlite Indicator Mineral Counts: Modern Alluvium (Continued)

Sample Number	Selected Pseudo KIMs				KIM Count																				
	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm								
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO	
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.
1025-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1026-Ma-99	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1028-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
1040-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1047-Ma-99	0	3	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
1049-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1063-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1065-Ma-99	0	10	20	150	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	1	0	0	0	3	0
1075-Ma-99	0	1	6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0
1079-Ma-99	0	4	45	0	0	0	0	3	0	0	0	1	0	78	0	0	0	0	0	25	400	1	0	0	0
1086-Ma-99	0	3	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1087-Ma-99	0	5	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0
1089-Ma-99	0	1	18	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
1091-Ma-99	0	2	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1093-Ma-99	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
1102-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1111-Ma-99	0	2	38	0	0	0	0	0	0	0	0	0	0	5	1	1	0	0	0	16	0	8	0	16	0
1113-Ma-99	4	29	53	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1115-Ma-99	0	1	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1119-Ma-99	0	8	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1121-Ma-99	0	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1133-Ma-99	0	2	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
1136-Ma-99	1	15	37	0	0	0	0	0	0	0	0	0	0	1	0	16	0	0	0	0	0	0	0	60	0
1156-Ma-99	0	3	20	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1168-Ma-99	0	0	30	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	500
1169-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	1200
1171-Ma-99	0	6	42	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	30	50
1173-Ma-99	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	400
1174-Ma-99	0	5	100	200	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	10	300
1175-Ma-99	Ns	8	25	1500	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1181-Ma-99	Ns	0	3	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1188-Ma-99	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
1190-Ma-99	0	3	5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0

Appendix B: Kimberlite Indicator Mineral Counts: Modern Alluvium (Continued)

Sample Number	Selected Pseudo KIMs				KIM Count																				
	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm								
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO	
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.
1197-Ma-99	0	4	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
1198-Ma-99	0	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1202-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1211-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0
1215-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
1222-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
1226-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1233-Ma-99	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1235-Ma-99	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1242-Ma-99	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1246-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
1248-Ma-99	0	0	11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
1256-Ma-99	0	2	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1258-Ma-99	0	3	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	350	0	0
1260-Ma-99	0	2	7	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	0	0	0	1	0	3	0
1262-Ma-99	0	1	128	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	15	26	150
1264-Ma-99	Ns	0	73	350	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	22	200
1266-Ma-99	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1268-Ma-99	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1270-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
1277-Ma-99	0	5	27	0	0	0	0	0	0	0	0	0	0	70	0	0	0	2	0	48	300	2	0	0	0
1296-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1298-Ma-99	0	1	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
1304-Ma-99	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1305-Ma-99	0	27	82	200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1307-Ma-99	Ns	0	0	0	Ns	Ns	Ns	Ns	Ns	Ns	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
1308-Ma-99	0	1	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1309-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	0	0	0	0	0	0	0	0
1310-Ma-99	0	1	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
1317-Ma-99	0	1	16	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	9	0
1318-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
1321-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1323-Ma-99	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B: Kimberlite Indicator Mineral Counts: Modern Alluvium (Continued)

Sample Number	Selected Pseudo KIMs				KIM Count																				
	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm								
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO	
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.
1325-Ma-99	3	92	10	500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1327-Ma-99	1	15	65	0	0	0	0	1	0	0	0	0	1	2	4	0	1	1	0	15	0	13	0	3	0
1329-Ma-99	1	0	2	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	1	0	3	0	1	0
1331-Ma-99	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
1333-Ma-99	1	2	3	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0
1340-Ma-99	0	1	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1342-Ma-99	0	1	19	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
1344-Ma-99	0	2	48	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0
1345-Ma-99	0	0	5	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0
1347-Ma-99	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PLMA # 1	Not Picked for KIMs																								

Appendix B: Kimberlite Indicator Mineral Counts: Till

Sample Number	Selected Pseudo KIMs				KIM Count																				
	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm								
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO	
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.
7-Tm-99	0	1	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
11-Tm-99	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
20-Tm-99	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Tm-99	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37-Tm-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
43-Tm-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51-Tm-99	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
58-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78-Tm-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
89-Tm-99	0	1	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B: Kimberlite Indicator Mineral Counts: Till (Continued)

Sample Number	Selected Pseudo KIMs				KIM Count																				
	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm								
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO	
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.
100-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
135-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
144-Tm-99	1	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
158-Tm-99	1	1	8	0	0	0	0	1	0	0	0	0	0	4	0	0	0	0	0	5	0	0	0	0	0
167-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
185-Tm-99	0	2	7	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
196-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
212-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
217-Tm-99	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0
226-Tm-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
239-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
258-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
268-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
285-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
294-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
328-Tm-99	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
333-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
338-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
355-Tm-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
367-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
388-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
393-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
398-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
403-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
425-Tm-99	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
430-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
435-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0
442-Tm-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
447-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
452-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	0	0	0	0	1	0	12	2000	0	0

Appendix B: Kimberlite Indicator Mineral Counts: Till (Continued)																									
Sample Number	Selected Pseudo KIMs				KIM Count																				
	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm								
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO	
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.
457-Tm-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
462-Tm-99	0	3	18	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
471-Tm-99	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
476-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	15	4	100
481-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52	0
488-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
497-Tm-99	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0
1006-Tm-99	0	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1017-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1024-Tm-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1034-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1039-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1046-Tm-99	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1055-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1062-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1073-Tm-99	0	2	12	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
1084-Tm-99	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0
1099-Tm-99	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	0	1	0	35	400
1109-Tm-99	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1126-Tm-99	0	2	9	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	18	500
1131-Tm-99	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
1141-Tm-99	0	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
1154-Tm-99	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1161-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1166-Tm-99	0	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1179-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1185-Tm-99	0	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1195-Tm-99	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	1	0
1209-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1220-Tm-99	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
1231-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1240-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1253-Tm-99	0	4	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B: Kimberlite Indicator Mineral Counts: Till (Continued)

Sample	Selected Pseudo KIMs				KIM Count																				
Number	1.0- 2.0 mm	0.5- 1.0 mm	0.25- 0.5 mm		1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm								
	Low/ very low- DC	Low/ very low- DC	Low/ very low- DC		GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM		CR		FO	
	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Est.
1275-Tm-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1315-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1338-Tm-99	0	1	4	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	1	0	0	0	0	0

APPENDIX B: Summary Counts of Picked and Estimated Numbers of Grains

Metamorphic or Magmatic Massive Sulphide Indicator Minerals

Summary of Abbreviations

Ba: Barite
Ch: Chalcopyrite
Co: Corundum
Cr: Chromite
Cru: Cr-rutile
Est.: Estimated Number of Grains
Fl: Florite
Gah: Gahnite
Gal: Galena
Gr: Grossular
Ky: Kyanite
Lc: Low Cr-Diopside
Lo: Loellingite
Ma: Modern Alluvium Sample
Me: Mn-epidote
Mo: Molybdenite
Mg-S: Magnesium Spinel
Ng: Native Gold
Ol: Olivine
Or: Orthopyroxene
Pic.: Picked or Counted Grains
Py: Pyrite
Sa: Sapphirine
Si: Sillimanite
Sph: Sphalerite
Spr: Sperrylite
Sps: Spessartine
St: Staurolite
Tm: Till Sample
Top: Topaz
Tou: Tourmaline
Ve: Vesuvianite

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals															
Number	Ba		Ch	Co	Cr		Cru	Fl	Gah	Gal	Gr	Ky (%)	Lc		Lo	Me	Mo
	Pic.	Est.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Pic.	Pic.
1-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	18	30	0	0	0
2-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0
8-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Ma-99	7	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	10	0	0	0	0
19-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	10	30	0	0	0
25-Ma-99	6	35	3	0	0	0	0	0	0	0	0	0	5	0	0	0	0
32-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	5	0	0	0	0
38-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0
46-Ma-99	0	0	8	0	0	0	0	0	0	0	0	0	2	0	0	0	0
52-Ma-99	0	0	1	0	2	0	0	0	0	0	0	0	26	716	0	0	0
54-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0
61-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	4	0	0	0	0
63-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	3	0	0	0	0
65-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0
71-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	16	100	0	0	0
72-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
73-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	2	0	0	0	0
84-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0
90-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
102-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0
106-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	9	0	0	0	0
108-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	11	0	0	0	0
109-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	1	0	0	0	0
111-Ma-99	0	0	0	0	2	0	0	0	0	0	0	Tr	58	0	0	0	0
112-Ma-99	0	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0	0
114-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0
121-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	14	0	0	0	0
123-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	22	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Mg-S	Ng	Ol		Or (%)	Py		Sa	Sl (%)	Sph		Spr	Sps (%)	St (%)	Top	Tou	Ve
	Pic.	Pic.	Pic.	Est.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Est.	Pic.	Pic.	Pic.
1-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-Ma-99	0	2	0	0	3	0	0	0	Tr	0	0	0	0	Tr	0	0	0
8-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9-Ma-99	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Ma-99	0	0	1	0	0	0	15	0	Tr	0	0	0	0	Tr	0	0	0
18-Ma-99	1	3	0	0	3	0	0	0	0	0	0	0	0	Tr	0	0	0
19-Ma-99	0	0	0	0	8	0	0	0	Tr	0	0	0	0	Tr	0	0	0
25-Ma-99	0	0	0	0	Tr	0	10	0	0	0	0	0	0	Tr	0	0	0
32-Ma-99	0	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
38-Ma-99	0	0	0	0	8	1	0	0	0	0	0	0	0	0	0	0	0
44-Ma-99	0	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0
46-Ma-99	0	0	0	0	Tr	10	0	0	0	0	0	0	0	Tr	0	0	0
52-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54-Ma-99	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59-Ma-99	0	3	0	0	Tr	0	35	0	0	0	0	0	0	0	0	0	0
61-Ma-99	0	1	0	0	5	0	15	0	0	0	0	0	0	0	0	0	0
63-Ma-99	0	5	0	0	3	0	400	0	0	0	0	0	0	0	0	0	0
65-Ma-99	0	4	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
71-Ma-99	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
72-Ma-99	0	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0
73-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	Tr	0	0	0
84-Ma-99	0	1	0	0	2	0	0	0	0	0	0	0	0	Tr	0	0	0
90-Ma-99	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
102-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0
104-Ma-99	2	0	0	0	0.5	1	0	0	Tr	0	0	0	0	Tr	0	0	0
106-Ma-99	0	0	0	0	0	0	0	0	Tr	0	0	0	0	Tr	0	0	0
108-Ma-99	0	0	0	0	0.5	0	0	0	Tr	0	0	0	0	Tr	0	0	0
109-Ma-99	1	1	0	0	Tr	10	0	0	0	0	0	0	0	Tr	0	0	0
111-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
112-Ma-99	0	0	0	0	Tr	5	0	0	0	0	0	0	0	0	0	0	0
114-Ma-99	1	0	0	0	0.5	0	0	0	0	0	0	0	0	Tr	0	0	0
121-Ma-99	1	1	0	0	Tr	5	0	0	Tr	0	0	0	0	Tr	0	0	0
123-Ma-99	0	0	0	0	1	5	0	0	0	0	0	0	0	Tr	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Ba		Ch	Co	Cr		Cru	Fl	Gah	Gal	Gr	Ky (%)	Lc		Lo	Me	Mo
	Pic.	Est.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Pic.	Pic.
125-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	2	0	0	0	0
127-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	5	0	0	0	0
129-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	2	0	0	0	0
136-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	7	0	0	0	0
145-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0.5	6	0	0	0	0
147-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	114	1000	0	0	0
151-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	14	0	0	0	0
153-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0
160-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	1	0
162-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	38	0	0	0	0
171-Ma-99	0	0	1	0	15	56	1	0	0	0	0	0.5	18	0	0	0	0
173-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0
174-Ma-99	0	0	2	0	0	0	0	0	0	0	0	Tr	16	0	0	0	1
191-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	26	0	0	1	0
198-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
200-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
201-Ma-99	0	0	0	1	1	0	0	0	0	0	0	Tr	22	100	0	0	0
219-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	7	0	0	0	0
221-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	5	0	0	0	0
228-Ma-99	0	0	2	0	0	0	1	0	0	0	0	Tr	50	0	0	0	0
230-Ma-99	0	0	0	3	2	0	5	0	1	0	0	Tr	36	0	0	0	0
232-Ma-99	0	0	0	0	0	0	1	0	1	0	0	0.5	17	0	0	2	0
234-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0
241-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
243-Ma-99	0	0	0	0	0	0	0	0	0	0	1	0	50	0	0	0	0
249-Ma-99	0	0	7	0	0	0	1	0	0	0	0	Tr	29	0	0	0	0
253-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	5	0	0	0	0
254-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
261-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
263-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	6	0	0	0	0
272-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
276-Ma-99	0	0	1	0	2	0	0	0	0	0	0	Tr	0	0	0	0	0
280-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Mg-S	Ng	Ol		Or (%)	Py		Sa	Si (%)	Sph		Spr	Sps (%)	St (%)	Top	Tou	Ve
	Pic.	Pic.	Pic.	Est.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Est.	Pic.	Pic.	Pic.
125-Ma-99	0	0	0	0	0.5	0	50	0	0	0	0	0	0	Tr	0	0	0
127-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	Tr	0	0	0
129-Ma-99	0	1	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0
136-Ma-99	0	1	0	0	0.5	1	0	0	0	0	0	0	0	Tr	0	0	0
145-Ma-99	1	1	0	0	0.5	0	0	0	0	0	0	0	0	Tr	0	0	0
147-Ma-99	0	0	2	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0
151-Ma-99	0	0	0	0	Tr	0	500	0	0	0	0	0	0	Tr	0	0	0
153-Ma-99	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0
162-Ma-99	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
169-Ma-99	0	0	0	0	1	0	0	1	Tr	0	0	0	0	0	0	0	0
171-Ma-99	0	0	0	0	Tr	0	25	0	0	0	0	0	0	Tr	0	0	0
173-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0
174-Ma-99	0	0	0	0	Tr	0	25	0	Tr	0	0	0	0	Tr	0	0	0
191-Ma-99	1	1	0	0	1	0	0	0	Tr	0	0	0	0	Tr	0	0	0
198-Ma-99	0	5	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
200-Ma-99	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
201-Ma-99	1	0	0	0	2	0	0	0	0	0	0	0	0	Tr	0	0	0
219-Ma-99	0	0	0	0	Tr	0	50	0	0	0	0	0	0	0	0	0	0
221-Ma-99	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
228-Ma-99	1	0	0	0	Tr	0	10	0	Tr	0	0	0	0	0	0	0	0
230-Ma-99	3	1	0	0	1	0	0	0	Tr	0	0	0	0	Tr	0	2	1
232-Ma-99	1	0	0	0	1	1	0	0	Tr	0	0	0	0	Tr	0	0	0
234-Ma-99	0	0	0	0	5	0	0	0	0	0	0	0	0	Tr	0	0	0
241-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
243-Ma-99	0	0	2	0	Tr	0	0	0	Tr	0	0	0	0	Tr	0	0	0
249-Ma-99	0	0	0	0	Tr	0	20	0	Tr	0	0	0	0	Tr	0	0	0
253-Ma-99	1	0	0	0	Tr	0	0	0	Tr	0	0	0	0	0	0	0	0
254-Ma-99	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
261-Ma-99	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
263-Ma-99	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
272-Ma-99	0	0	0	0	Tr	0	75	0	0	0	0	0	0	0	0	0	0
276-Ma-99	0	0	0	0	Tr	0	10	0	0	0	0	0	0	Tr	0	0	0
280-Ma-99	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals															
Number	Ba		Ch	Co	Cr		Cru	Fl	Gah	Gal	Gr	Ky (%)	Lc		Lo	Me	Mo
	Pic.	Est.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Pic.	Pic.
287-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
296-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	13	0	0	0	0
298-Ma-99	0	0	0	0	0	0	2	0	0	0	0	Tr	2	0	0	0	0
305-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1
307-Ma-99	0	0	0	0	1	0	1	0	0	0	0	0	28	0	0	0	0
309-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
311-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	1	0	0	0	0
313-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
319-Ma-99	0	0	0	0	1	0	0	0	0	0	0	Tr	5	0	0	0	0
321-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	1	0	0	0	0
323-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0
330-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
335-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
340-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	25	0	0	0	0
342-Ma-99	0	0	0	0	1	0	0	0	0	0	0	Tr	16	0	0	0	0
344-Ma-99	0	0	0	1	7	15	2	0	0	0	0	Tr	28	0	0	0	0
346-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
357-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	26	0	0	0	0
362-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	6	0	0	0	0
369-Ma-99	0	0	4	0	0	0	0	0	0	0	0	0	3	0	0	0	0
371-Ma-99	0	0	3	0	26	100	0	0	0	0	0	0	8	0	0	4	0
373-Ma-99	0	0	3	0	24	75	2	0	0	0	0	Tr	10	0	0	0	0
377-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	19	0	0	0	0
379-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	8	0	0	0	0
381-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	33	0	0	1	0
383-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	15	0	0	0	0
405-Ma-99	0	0	0	0	19	40	1	0	0	0	0	Tr	56	0	0	1	0
407-Ma-99	0	0	0	0	2	0	0	0	0	0	0	0	6	0	0	0	0
409-Ma-99	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	0	0
411-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0
413-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
415-Ma-99	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0
417-Ma-99	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
418-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	2	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals															
Number	Mg-S	Ng	Ol		Or (%)	Py		Sa	Sl (%)	Sph		Spr	Sps (%)	St (%)	Top	Tou	Ve
	Pic.	Pic.	Pic.	Est.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Est.	Pic.	Pic.	Pic.
287-Ma-99	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
296-Ma-99	0	0	0	0	1	0	10	0	Tr	0	0	0	0	0	0	0	0
298-Ma-99	2	0	0	0	Tr	0	15	0	0	0	0	0	0	Tr	0	0	0
305-Ma-99	0	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0	0
307-Ma-99	0	0	0	0	12	5	0	0	0	0	0	0	0	0	0	0	0
309-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
311-Ma-99	0	0	0	0	Tr	1	0	0	0	0	0	0	0	Tr	0	0	0
313-Ma-99	0	0	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0	0
319-Ma-99	0	0	0	0	Tr	3	0	0	0	0	0	0	0	Tr	0	0	0
321-Ma-99	0	0	0	0	Tr	0	75	0	0	0	0	0	0	0	0	0	0
323-Ma-99	0	0	0	0	2	3	0	0	0	0	0	0	0	Tr	0	0	0
330-Ma-99	0	0	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0
335-Ma-99	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
340-Ma-99	0	0	0	0	4	0	0	0	Tr	0	0	0	0	Tr	0	0	0
342-Ma-99	0	2	0	0	2	1	0	0	Tr	0	0	0	1	Tr	0	0	0
344-Ma-99	0	1	0	0	Tr	2	0	0	Tr	0	0	0	0	Tr	0	0	0
346-Ma-99	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0
357-Ma-99	0	1	0	0	0.5	1	0	0	Tr	0	0	0	0	Tr	0	0	0
362-Ma-99	0	1	0	0	4	3	0	0	0	0	0	0	0	Tr	0	0	0
369-Ma-99	0	0	0	0	1	0	1000	0	Tr	0	0	0	0	0	0	0	0
371-Ma-99	0	1	0	0	Tr	5	0	0	Tr	0	0	0	0	0	0	0	0
373-Ma-99	1	0	0	0	Tr	0	400	0	Tr	0	0	0	0	0	0	0	0
377-Ma-99	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0
379-Ma-99	0	0	0	0	0	0	300	0	0	0	0	0	0	Tr	0	0	0
381-Ma-99	0	0	0	0	1	0	0	0	0	0	0	0	0	2	0	0	0
383-Ma-99	0	0	0	0	1	15	0	0	0	0	0	0	0	0	0	0	0
405-Ma-99	0	0	2	0	Tr	2	0	0	Tr	0	0	0	0	Tr	0	0	0
407-Ma-99	0	0	21	0	0	0	10	0	0	0	0	0	0	0	0	0	0
409-Ma-99	0	0	0	0	Tr	0	10	0	Tr	0	0	0	4	Tr	0	0	0
411-Ma-99	0	0	0	0	Tr	0	1500	0	Tr	0	0	0	0	Tr	0	0	0
413-Ma-99	0	0	0	0	Tr	0	20	0	Tr	0	0	0	0	Tr	0	0	0
415-Ma-99	0	0	0	0	Tr	5	0	0	0	0	0	0	0	Tr	0	0	0
417-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	Tr	0	0	0
418-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	Tr	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals															
Number	Ba		Ch	Co	Cr		Cru	Fl	Gah	Gal	Gr	Ky (%)	Lc		Lo	Me	Mo
	Pic.	Est.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Pic.	Pic.
419-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
420-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	10	0	0	0	0
437-Ma-99	0	0	7	0	3	0	0	0	0	0	0	0	17	0	0	0	0
464-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	6	0	0	0	0
466-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
483-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	2	0	0	0	0
490-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	1	0	0	0	0
492-Ma-99	0	0	2	0	0	0	2	0	0	0	0	0	3	0	0	0	0
1007-Ma-99	0	0	1	0	1	0	0	0	0	0	0	0.5	8	0	0	0	0
1011-Ma-99	0	0	0	0	0	0	1	0	0	0	0	1	6	0	0	0	0
1025-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1026-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0.5	25	0	0	0	0
1028-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
1040-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0
1047-Ma-99	0	0	0	0	1	0	0	0	0	0	0	0	25	0	0	0	2
1049-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
1063-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1065-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	30	150	0	0	0
1075-Ma-99	0	0	0	1	2	0	0	0	0	0	0	Tr	7	0	0	0	0
1079-Ma-99	0	0	1	0	1	0	0	0	0	0	0	Tr	49	0	0	0	0
1086-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	25	0	0	0	0
1087-Ma-99	0	0	5	0	0	0	0	1	2	15	0	0	54	0	0	0	0
1089-Ma-99	0	0	0	0	2	0	0	0	0	0	0	0	19	0	0	0	0
1091-Ma-99	0	0	26	0	0	0	0	0	0	0	0	0	28	0	0	0	0
1093-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0
1102-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1111-Ma-99	0	0	1	0	9	0	1	0	0	0	0	0	40	0	0	0	0
1113-Ma-99	0	0	1	1	0	0	0	1	0	0	0	0	86	0	0	0	0
1115-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0
1119-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0
1121-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0
1133-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	19	0	0	0	0
1136-Ma-99	0	0	2	0	0	0	0	0	0	0	0	Tr	53	0	0	0	0
1156-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	23	150	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Mg-S	Ng	Ol		Or (%)	Py		Sa	Si (%)	Sph		Spr	Sps (%)	St (%)	Top	Tou	Ve
	Pic.	Pic.	Pic.	Est.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Est.	Pic.	Pic.	Pic.
419-Ma-99	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
420-Ma-99	0	0	0	0	Tr	0	30	0	0	0	0	0	0	Tr	0	0	0
437-Ma-99	1	0	2	0	Tr	0	4000	0	0	0	0	0	1	1	0	0	0
464-Ma-99	0	0	2	0	1	10	0	0	0	0	0	0	0	Tr	0	0	0
466-Ma-99	0	0	0	0	1	1	0	0	0	0	0	0	0	Tr	0	0	0
483-Ma-99	0	391	0	0	0	0	30000	0	0	0	0	0	0	0	0	0	0
490-Ma-99	0	0	0	0	Tr	15	0	0	Tr	0	0	0	0	Tr	0	0	0
492-Ma-99	0	2	29	0	1	5	0	0	Tr	0	0	0	0	Tr	0	0	0
1007-Ma-99	4	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
1011-Ma-99	0	0	0	0	2	0	0	0	0	0	0	0	0	Tr	0	0	0
1025-Ma-99	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1026-Ma-99	1	0	0	0	7	2	0	0	0	0	0	0	0	0	0	0	0
1028-Ma-99	0	0	0	0	3	5	0	0	0	0	0	0	0	0	0	0	0
1040-Ma-99	0	0	0	0	1	0	35	0	0	0	0	0	0	0	0	1	0
1047-Ma-99	0	0	0	0	0.5	0	50	0	0	0	0	0	0	Tr	0	0	0
1049-Ma-99	0	0	0	0	Tr	0	30	0	0	0	0	0	0	Tr	0	0	0
1063-Ma-99	0	0	0	0	0	0	225	0	0	0	0	0	0	0	0	0	0
1065-Ma-99	0	0	4	0	4	5	0	0	0	0	0	0	0	0	0	1	0
1075-Ma-99	2	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
1079-Ma-99	0	0	0	0	1	1	0	0	Tr	0	0	0	0	Tr	0	0	0
1086-Ma-99	2	0	0	0	Tr	3	0	0	Tr	0	0	0	0	Tr	0	0	0
1087-Ma-99	0	0	11	0	1	0	100	0	Tr	131	200	0	Tr	Tr	0	0	0
1089-Ma-99	0	0	1	0	Tr	0	20	0	Tr	0	0	0	0	Tr	0	0	0
1091-Ma-99	0	1	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0
1093-Ma-99	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0
1102-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	Tr	0	0	0
1111-Ma-99	0	0	17	0	Tr	0	50	0	0	1	0	0	0	0	0	0	0
1113-Ma-99	0	0	0	0	Tr	1	0	0	0	0	0	0	0	0	0	0	0
1115-Ma-99	0	1	0	0	Tr	1	0	0	0	0	0	0	0	0	0	0	0
1119-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
1121-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
1133-Ma-99	0	0	1	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
1136-Ma-99	0	0	76	0	1	2	0	0	0	0	0	0	0	Tr	0	0	0
1156-Ma-99	0	0	0	0	Tr	2	0	0	Tr	0	0	0	0	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Ba		Ch	Co	Cr		Cru	Fl	Gah	Gal	Gr	Ky (%)	Lc		Lo	Me	Mo
	Pic.	Est.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Pic.	Pic.
1168-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	30	100	0	0	0
1169-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	2	0	0	0	0
1171-Ma-99	0	0	4	0	0	0	0	0	0	0	0	Tr	48	0	0	0	0
1173-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	11	0	0	0	0
1174-Ma-99	0	0	0	0	0	0	5	0	0	0	0	Tr	105	200	0	5	0
1175-Ma-99	0	0	0	0	0	0	1	0	0	0	0	Tr	33	1500	0	1	0
1181-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	3	0	0	0	0
1188-Ma-99	0	0	1	0	0	0	0	0	0	0	0	0	6	0	0	0	0
1190-Ma-99	0	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0	0
1197-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	42	0	0	0	0
1198-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0
1202-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
1211-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
1215-Ma-99	0	0	1	0	1	0	0	0	0	0	0	Tr	2	0	0	0	1
1222-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	2	0	0	0	0
1226-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1233-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	4	0	0	0	0
1235-Ma-99	0	0	1	0	0	0	0	0	0	0	0	Tr	3	0	0	0	0
1242-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	5	0	0	0	0
1246-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
1248-Ma-99	0	0	0	2	0	0	0	0	0	0	0	Tr	11	0	0	0	0
1256-Ma-99	0	0	8	0	0	0	0	0	0	0	0	0	12	0	0	0	0
1258-Ma-99	0	0	4	0	77	350	0	0	0	0	0	0	44	0	0	0	0
1260-Ma-99	0	0	7	0	3	0	0	0	1	0	0	0	9	0	0	0	0
1262-Ma-99	0	0	3	0	3	15	0	0	0	0	0	Tr	129	200	0	0	0
1264-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	73	350	0	0	0
1266-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
1268-Ma-99	0	0	0	0	0	0	0	0	1	0	1	Tr	5	0	0	0	0
1270-Ma-99	0	0	1	0	3	0	0	0	0	0	0	0	3	0	0	1	0
1277-Ma-99	0	0	0	0	2	0	0	0	0	0	0	0	32	0	0	0	0
1296-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
1298-Ma-99	0	0	2	0	0	0	0	0	0	0	0	0	31	0	0	0	0
1304-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	18	0	0	0	0
1305-Ma-99	0	0	3	0	0	0	0	0	0	0	0	0	109	200	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample Number	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
	Mg-S	Ng	Ol		Or (%)	Py		Sa	Si (%)	Sph		Spr	Sps (%)	St (%)	Top	Tou	Ve
	Pic.	Pic.	Pic.	Est.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Est.	Pic.	Pic.	Pic.
1168-Ma-99	0	0	5	500	7	0	0	0	0	0	0	0	0	Tr	0	0	0
1169-Ma-99	0	0	46	1200	Tr	6	0	0	Tr	0	0	0	0	0	0	0	0
1171-Ma-99	0	0	30	50	Tr	0	50	0	0	0	0	0	0	Tr	0	0	0
1173-Ma-99	0	0	24	400	Tr	1	0	0	Tr	0	0	0	0	Tr	0	0	0
1174-Ma-99	3	0	10	300	Tr	5	0	0	Tr	0	0	0	0	Tr	0	0	0
1175-Ma-99	0	0	0	0	Tr	0	0	0	Tr	0	0	0	0	Tr	0	0	0
1181-Ma-99	0	0	0	0	4	0	0	0	Tr	0	0	0	0	Tr	0	0	0
1188-Ma-99	0	0	1	0	3	0	1500	0	0	0	0	0	0	Tr	0	0	0
1190-Ma-99	0	0	1	0	Tr	0	0	0	0	0	0	0	0	Tr	0	0	0
1197-Ma-99	0	1	4	0	0.5	0	0	0	0	0	0	0	0	Tr	0	0	0
1198-Ma-99	0	0	0	0	2	3	0	0	Tr	0	0	0	0	Tr	0	0	0
1202-Ma-99	0	0	0	0	Tr	0	30	0	Tr	0	0	0	0	0	0	0	0
1211-Ma-99	0	0	4	0	0	0	30	0	Tr	0	0	0	0	0	0	0	0
1215-Ma-99	0	0	0	0	5	3	0	0	0	0	0	0	0	Tr	0	0	0
1222-Ma-99	0	0	0	0	Tr	2	0	0	0	0	0	0	0	Tr	0	0	0
1226-Ma-99	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0
1233-Ma-99	0	1	0	0	0	0	0	0	Tr	0	0	0	0	Tr	0	0	0
1235-Ma-99	0	0	0	0	Tr	2	0	0	Tr	0	0	0	Tr	Tr	0	0	0
1242-Ma-99	1	0	0	0	0.5	3	0	0	Tr	0	0	0	0	Tr	0	0	0
1246-Ma-99	0	0	1	0	Tr	0	10	0	0	0	0	0	0	0	0	0	0
1248-Ma-99	0	3	0	0	1	0	25	0	Tr	0	0	0	0	0	0	0	0
1256-Ma-99	0	0	0	0	5	0	50	0	0	0	0	0	0	Tr	0	0	0
1258-Ma-99	0	0	0	0	5	0	0	0	0	0	0	0	Tr	Tr	0	0	0
1260-Ma-99	0	0	3	0	Tr	7	0	0	Tr	0	0	0	Tr	Tr	0	0	0
1262-Ma-99	0	0	26	150	8	0	20	0	Tr	0	0	0	0	Tr	0	0	0
1264-Ma-99	0	0	22	200	6	5	0	0	Tr	0	0	0	0	Tr	0	0	0
1266-Ma-99	0	0	0	0	1	0	0	0	0	0	0	0	0	Tr	0	0	0
1268-Ma-99	1	0	0	0	Tr	0	20	0	Tr	0	0	0	0	0	0	0	0
1270-Ma-99	0	1	0	0	Tr	5	0	0	Tr	0	0	0	0	Tr	0	0	0
1277-Ma-99	1	0	0	0	Tr	0	5	0	Tr	0	0	0	Tr	Tr	0	0	0
1296-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
1298-Ma-99	1	0	1	0	Tr	0	20	0	0	0	0	0	Tr	0	0	0	0
1304-Ma-99	0	3	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0
1305-Ma-99	0	0	0	0	2	10	0	0	0	0	0	0	0	Tr	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Ba		Ch	Co	Cr		Cru	Fl	Gah	Gal	Gr	Ky (%)	Lc		Lo	Me	Mo
	Pic.	Est.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Pic.	Pic.
1307-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1308-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0
1309-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1310-Ma-99	0	0	0	0	2	0	0	0	0	0	0	Tr	13	0	0	0	0
1317-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	17	0	0	0	1
1318-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0
1321-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0
1323-Ma-99	0	0	0	0	0	0	2	0	0	0	0	Tr	3	0	0	0	0
1325-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	102	500	0	1	2
1327-Ma-99	0	0	1	1	17	0	2	0	1	0	0	Tr	81	0	0	0	0
1329-Ma-99	0	0	0	0	5	0	0	0	0	0	0	Tr	3	0	0	0	0
1331-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0.5	4	0	0	0	0
1333-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0.5	6	0	0	0	0
1340-Ma-99	0	0	0	0	0	0	0	0	0	0	0	1	8	0	0	0	0
1342-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	20	0	0	0	0
1344-Ma-99	0	0	0	0	1	0	0	0	0	0	0	Tr	50	0	0	0	0
1345-Ma-99	0	0	0	0	2	0	0	0	0	0	0	Tr	5	0	0	0	0
1347-Ma-99	0	0	0	0	0	0	0	0	0	0	0	Tr	8	0	0	0	0
PLMA# 1	2	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Till

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Ba		Ch	Co	Cr		Cru	Fl	Gah	Gal	Gr	Ky (%)	Lc		Lo	Me	Mo
	Pic.	Est.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Pic.	Pic.
7-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	5	0	0	0	0
11-Tm-99	0	0	0	0	0	0	2	0	0	0	0	Tr	10	0	0	0	0
20-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	4	0	0	0	0
31-Tm-99	0	0	0	0	0	0	2	0	0	0	0	Tr	2	0	0	0	0
37-Tm-99	0	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0
43-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
51-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Modern Alluvium (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Mg-S	Ng	Ol		Or (%)	Py		Sa	Si (%)	Sph		Spr	Sps (%)	St (%)	Top	Tou	Ve
	Pic.	Pic.	Pic.	Est.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Est.	Pic.	Pic.	Pic.
1307-Ma-99	0	0	10	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0
1308-Ma-99	0	0	0	0	Tr	1	0	0	0	0	0	0	0	Tr	0	0	0
1309-Ma-99	0	0	53	0	0	1	0	0	0	0	0	0	0	Tr	0	0	0
1310-Ma-99	0	2	0	0	Tr	1	0	0	0	0	0	0	0	Tr	0	0	0
1317-Ma-99	0	2	12	0	Tr	0	0	0	0	0	0	0	0	Tr	0	0	0
1318-Ma-99	0	0	3	0	2	0	10	0	Tr	0	0	0	0	Tr	0	0	0
1321-Ma-99	0	0	0	0	Tr	5	0	0	0	0	0	0	0	Tr	0	0	0
1323-Ma-99	0	0	0	0	Tr	0	100	0	Tr	0	0	0	0	Tr	0	0	0
1325-Ma-99	1	0	0	0	10	3	0	0	Tr	0	0	0	0	0	0	0	0
1327-Ma-99	2	0	3	0	Tr	5	0	0	Tr	0	0	0	Tr	Tr	0	0	0
1329-Ma-99	1	1	0	0	Tr	0	0	0	0	0	0	0	Tr	Tr	0	0	0
1331-Ma-99	0	0	0	0	3	0	0	0	0	0	0	0	0	Tr	0	0	0
1333-Ma-99	2	0	0	0	Tr	0	75	0	0	0	0	0	0	Tr	0	0	0
1340-Ma-99	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
1342-Ma-99	0	0	0	0	5	0	0	0	Tr	0	0	0	0	Tr	0	0	0
1344-Ma-99	0	0	2	0	Tr	2	0	0	Tr	0	0	0	0	Tr	0	0	0
1345-Ma-99	0	0	0	0	0	7	0	0	Tr	0	0	0	0	Tr	0	0	0
1347-Ma-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	Tr	0	0	0
PLMA # 1	0	4	0	0	Tr	2	0	0	0	0	0	0	0	Tr	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Till (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Mg-S	Ng	Ol		Or (%)	Py		Sa	Si (%)	Sph		Spr	Sps (%)	St (%)	Top	Tou	Ve
	Pic.	Pic.	Pic.	Est.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Est.	Pic.	Pic.	Pic.
7-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0
11-Tm-99	2	1	0	0	Tr	0	0	0	0	0	0	0	0	Tr	0	0	0
20-Tm-99	0	2	0	0	2	7	0	0	0	0	0	0	Tr	Tr	0	0	0
31-Tm-99	0	1	0	0	0	0	10	0	0	0	0	0	0	Tr	0	0	0
37-Tm-99	0	2	0	0	Tr	0	0	0	0	0	0	0	Tr	Tr	0	0	0
43-Tm-99	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0
51-Tm-99	0	1	0	0	1	0	0	0	0	0	0	0	Tr	Tr	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Till (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals															
Number	Ba		Ch	Co	Cr		Cru	Fl	Gah	Gal	Gr	Ky (%)	Lc		Lo	Me	Mo
	Pic.	Est.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Pic.	Pic.
58-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
83-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0
89-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	3	0	0	0	0
95-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
120-Tm-99	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
135-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
144-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	11	0	0	0	0
158-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	10	0	0	0	0
167-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
185-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	1	0
196-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
212-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
217-Tm-99	0	0	1	0	3	0	0	0	0	0	0	0	3	0	0	0	0
226-Tm-99	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0
239-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
258-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
268-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
285-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
294-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
303-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
328-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
333-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0
338-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
355-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
367-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
388-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
393-Tm-99	0	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0
398-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0
403-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
425-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Till (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Mg-S	Ng	Ol		Or (%)	Py		Sa	Sl (%)	Sph		Spr	Sps (%)	St (%)	Top	Tou	Ve
	Pic.	Pic.	Pic.	Est.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Est.	Pic.	Pic.	Pic.
58-Tm-99	0	1	0	0	90	0	0	0	0	0	0	0	0	0	0	0	0
70-Tm-99	0	0	0	0	90	0	0	0	0	0	0	0	0	0	0	0	0
78-Tm-99	0	2	0	0	10	0	30	0	0	0	0	0	0	0	0	0	0
83-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0
89-Tm-99	0	3	0	0	0.5	2	0	0	0	0	0	0	0	Tr	0	0	0
95-Tm-99	0	0	0	0	Tr	0	0	0	0	0	0	0	1	5	0	0	0
100-Tm-99	0	1	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	0	0
120-Tm-99	0	0	0	0	15	2	0	0	0	0	0	0	0	Tr	0	0	0
135-Tm-99	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
144-Tm-99	0	2	0	0	3	0	0	0	0	0	0	0	Tr	0	0	0	0
158-Tm-99	0	1	0	0	Tr	0	0	0	0	0	0	0	0	Tr	0	0	0
167-Tm-99	0	0	0	0	Tr	0	0	0	0	0	0	0	Tr	0	0	0	0
185-Tm-99	0	16	0	0	2	0	0	0	0	0	0	0	Tr	Tr	0	0	0
196-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
212-Tm-99	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0
217-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
226-Tm-99	0	0	0	0	15	0	15	0	0	0	0	0	0	Tr	0	0	0
239-Tm-99	0	0	0	0	Tr	7	0	0	0	0	0	0	0	0	0	0	0
258-Tm-99	0	1	0	0	0	0	15	0	0	0	0	0	0	Tr	0	0	0
268-Tm-99	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
285-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0
294-Tm-99	0	0	0	0	0	2	0	0	0	0	0	0	0	Tr	0	0	0
303-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0
328-Tm-99	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0
333-Tm-99	0	4	0	0	65	0	0	0	0	0	0	0	0	Tr	0	0	0
338-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
350-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
355-Tm-99	0	1	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
367-Tm-99	0	0	0	0	1	0	20	0	0	0	0	0	0	0	0	0	0
388-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0
393-Tm-99	0	1	0	0	1	0	0	0	0	0	0	0	0	Tr	0	0	0
398-Tm-99	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0
403-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
425-Tm-99	0	2	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Till (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Ba		Ch	Co	Cr		Cru	Fl	Gah	Gal	Gr	Ky (%)	Lc		Lo	Me	Mo
	Pic.	Est.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Pic.	Pic.
430-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
435-Tm-99	0	0	0	0	1	0	0	0	0	0	0	Tr	1	0	0	0	0
442-Tm-99	0	0	0	0	0	0	26	0	0	0	0	Tr	2	0	0	0	0
447-Tm-99	0	0	2	0	0	0	8	0	0	0	0	0	1	0	0	0	0
452-Tm-99	0	0	0	0	39	2000	0	0	0	0	0	Tr	0	0	0	0	0
457-Tm-99	0	0	0	0	0	0	1	0	0	0	0	Tr	2	0	0	0	0
462-Tm-99	0	0	0	0	1	0	6	0	0	0	0	0	21	0	0	0	0
471-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
476-Tm-99	0	0	0	0	5	15	0	0	0	0	0	0	0	0	0	0	0
481-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
488-Tm-99	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
497-Tm-99	0	0	0	0	2	0	3	0	0	0	0	Tr	4	0	0	0	0
1006-Tm-99	0	0	0	0	0	0	2	0	0	0	0	0.5	13	0	0	0	0
1017-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1024-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	3	0	0	0	0
1034-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0
1039-Tm-99	0	0	0	0	0	0	1	0	0	0	0	Tr	1	0	0	0	0
1046-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	9	0	0	0	0
1055-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1062-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0
1073-Tm-99	0	0	0	0	0	0	22	0	0	0	0	Tr	14	0	0	0	0
1084-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	12	0	0	0	1
1099-Tm-99	0	0	0	0	1	0	0	0	0	0	0	Tr	5	0	0	0	0
1109-Tm-99	0	0	0	0	0	0	0	0	0	0	0	Tr	3	0	0	0	0
1126-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0
1131-Tm-99	0	0	0	1	0	0	0	0	0	0	0	0	11	0	0	0	0
1141-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0
1154-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
1161-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1166-Tm-99	0	0	1	0	0	0	1	0	0	0	0	Tr	11	0	0	0	0
1179-Tm-99	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
1185-Tm-99	0	0	1	0	0	0	2	0	0	0	0	Tr	6	0	0	0	0
1195-Tm-99	0	0	0	0	3	0	0	0	0	0	0	Tr	5	0	0	0	0
1209-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Till (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Mg-S	Ng	Ol		Or (%)	Py		Sa	Si (%)	Sph		Spr	Sps (%)	St (%)	Top	Tou	Ve
	Pic.	Pic.	Pic.	Est.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Est.	Pic.	Pic.	Pic.
430-Tm-99	0	0	0	0	Tr	0	250	0	0	0	0	0	0	0	0	0	0
435-Tm-99	0	0	0	0	0	0	750	1	0	0	0	0	0	0	0	0	0
442-Tm-99	0	0	0	0	0	0	1200	0	0	0	0	0	0	0	0	0	0
447-Tm-99	0	0	0	0	0	0	2500	0	0	0	0	0	0	0	0	0	0
452-Tm-99	0	0	0	0	Tr	0	0	0	0	0	0	0	Tr	Tr	0	0	0
457-Tm-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
462-Tm-99	0	0	0	0	Tr	5	0	0	0	0	0	0	0	Tr	0	0	0
471-Tm-99	0	2	0	0	1	0	50	0	0	0	0	0	0	Tr	0	0	0
476-Tm-99	0	4	4	100	Tr	0	0	0	Tr	0	0	0	0	Tr	0	0	0
481-Tm-99	0	1	52	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0
488-Tm-99	0	1096*	0	0	2	40	0	0	0	0	0	0	Tr	Tr	0	0	0
497-Tm-99	0	2	0	0	0	15	0	0	0	0	0	0	0	Tr	0	0	0
1006-Tm-99	0	10	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
1017-Tm-99	0	4	0	0	0	4	0	0	Tr	0	0	0	0	Tr	0	0	0
1024-Tm-99	0	0	0	0	0	2	0	0	0	0	0	0	0	Tr	0	0	0
1034-Tm-99	0	0	0	0	5	0	0	0	0	0	0	0	Tr	0	0	0	0
1039-Tm-99	0	4	0	0	0	1	0	0	Tr	0	0	0	0	Tr	0	0	0
1046-Tm-99	0	5	0	0	50	1	0	0	0	0	0	0	Tr	Tr	0	0	0
1055-Tm-99	0	1	0	0	8	0	0	0	0	0	0	0	Tr	Tr	0	0	0
1062-Tm-99	0	6	0	0	2	2	0	0	0	0	0	0	0	Tr	0	0	0
1073-Tm-99	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1084-Tm-99	0	7	10	0	Tr	4	0	0	0	0	0	0	0	Tr	0	0	0
1099-Tm-99	0	1	44	400	Tr	1	0	0	0	0	0	0	0	Tr	0	0	0
1109-Tm-99	0	0	0	0	1	0	10	0	Tr	0	0	0	0	0	0	0	0
1126-Tm-99	0	2	19	500	Tr	0	0	0	0	0	0	0	0	0	0	0	0
1131-Tm-99	0	3	6	0	Tr	0	10	0	0	0	0	0	0	0	0	0	0
1141-Tm-99	0	4	6	0	Tr	0	10	0	0	0	0	0	Tr	0	0	0	0
1154-Tm-99	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1161-Tm-99	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
1166-Tm-99	0	0	0	0	Tr	0	15	0	Tr	0	0	0	0	Tr	0	0	0
1179-Tm-99	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0	0	0
1185-Tm-99	0	1	0	0	Tr	2	0	0	0	0	0	0	0	Tr	0	0	0
1195-Tm-99	0	0	2	0	1	2	0	0	0	0	0	0	0	Tr	0	0	0
1209-Tm-99	0	0	0	0	0	0	1000	0	Tr	0	0	0	0	Tr	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Till (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Ba		Ch	Co	Cr		Cru	Fl	Gah	Gal	Gr	Ky (%)	Lc		Lo	Me	Mo
	Pic.	Est.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Est.	Pic.	Pic.	Pic.
1220-Tm-99	0	0	0	0	0	0	0	0	1	0	0	Tr	1	0	0	0	0
1231-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1240-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1253-Tm-99	0	0	0	0	0	0	3	0	0	0	0	Tr	22	0	0	0	0
1275-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
1315-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1338-Tm-99	0	0	0	0	1	0	0	0	0	0	0	Tr	5	0	0	0	0

Appendix B: Metamorphic or Magmatic Massive Sulphide Indicator Minerals: Till (Continued)

Sample	Metamorphic or Magmatic Massive Sulphide Indicator Minerals																
Number	Mg-S	Ng	Ol		Or (%)	Py		Ss	Sl (%)	Sph		Spr	Sps (%)	St (%)	Top	Tou	Ve
	Pic.	Pic.	Pic.	Est.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Pic.	Est.	Est.	Pic.	Pic.	Pic.
1220-Tm-99	0	1	0	0	Tr	0	5000	0	0	0	0	0	Tr	0	0	0	0
1231-Tm-99	0	3	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
1240-Tm-99	0	5	0	0	Tr	0	35	0	0	0	0	0	0	Tr	0	0	0
1253-Tm-99	0	1	0	0	3	0	0	0	0	0	0	0	Tr	Tr	0	0	0
1275-Tm-99	0	1	0	0	0	0	125	0	0	0	0	0	0	Tr	0	0	0
1315-Tm-99	0	1	0	0	Tr	1	0	0	0	0	0	0	0	Tr	0	0	0
1338-Tm-99	1	0	0	0	Tr	0	1500	0	0	0	0	0	0	Tr	0	0	0

APPENDIX B: Summary Counts of Picked and Estimated Numbers of Grains

Carbonatite Indicator Minerals

Summary of Abbreviations

Est.	Estimated Number of Grains
Ma:	Modern Alluvium Sample
Pic.:	Picked or Counted Grains
Tm:	Till Sample

Appendix B: Carbonatite Indicator Mineral Counts

Mineral	Andradite		Augite	Augite-Hedenbergite	Augite+Fayalite	Barite		Barite+Quartz+Leucoxene	Barite+Synchysite		Bastnaestite+Apatite	Diopside+Ti-Andradite	Diop.+Ti-Andra.+Per.	Hedenbergite	Ilmenite+Pyrochlore	Ilmeno-rutile	Monazite	Nb-Perovskite	Perovskite	Pyrochlore		Richterite+Calcite	Richterite+Forsterite	Rutile
Sample	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Pic.	Est.	Pic.	Pic.	Pic.
16-Ma-99	11	0	2	0	0	7	0	0	27	5000	1	0	0	0	0	0	0	0	1	9	200	1	1	0
25-Ma-99	0	0	0	0	0	6	35	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
377-Ma-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PLMA # 1	4	1000	0	0	0	2	0	0	65	100	0	0	0	1	0	0	1	0	3	11	0	0	0	1
120-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
217-Tm-99	0	0	0	0	0	0	0	0	0	0	0	1	6	0	0	0	0	0	0	0	0	0	0	0
425-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	1
430-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4
435-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
442-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	4
447-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3
452-Tm-99	4	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
457-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
462-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	0	0	0	6
476-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0
497-Tm-99	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	62	570	0	0	3
1126-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
1141-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1179-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
1220-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0
1315-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	8	0	0	0	0
1338-Tm-99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0

Appendix B: Carbonatite Indicator Mineral Counts (Continued)

Mineral	Rutile-Perovskite		Synchysite	Ti-Andradite	Ti-Andradite+Feldspar	Zircon
Sample	Pic.	Est.	Pic.	Pic.	Pic.	Pic.
16-Ma-99	0	0	1	17	1	9
25-Ma-99	0	0	0	0	0	0
377-Ma-99	0	0	0	1	0	0
PLMA # 1	0	0	0	0	0	3
120-Tm-99	0	0	0	0	0	0
217-Tm-99	0	0	0	0	0	0
425-Tm-99	3	100	0	0	0	0
430-Tm-99	5	100	0	0	0	0
435-Tm-99	0	0	0	0	0	0
442-Tm-99	22	0	0	0	0	0
447-Tm-99	5	0	0	0	0	0
452-Tm-99	0	0	0	2	0	0
457-Tm-99	10	0	0	1	0	0
462-Tm-99	25	400	0	3	0	0
476-Tm-99	0	0	0	0	0	0
497-Tm-99	14	0	0	0	0	5
1126-Tm-99	0	0	0	0	0	4
1141-Tm-99	0	0	0	0	0	4
1179-Tm-99	13	0	0	0	0	0
1220-Tm-99	0	0	0	0	0	0
1315-Tm-99	0	0	0	0	0	3
1338-Tm-99	0	0	0	0	0	0

Metric Conversion Table

Conversion from SI to Imperial			Conversion from Imperial to SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
			LENGTH		
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
			AREA		
1 cm^2	0.155 0	square inches	1 square inch	**6.451 6**	cm^2
1 m^2	10.763 9	square feet	1 square foot	**0.092 903 04**	m^2
1 km^2	0.386 10	square miles	1 square mile	2.589 988	km^2
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
			VOLUME		
1 cm^3	0.061 023	cubic inches	1 cubic inch	**16.387 064**	cm^3
1 m^3	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m^3
1 m^3	1.307 951	cubic yards	1 cubic yard	0.764 554 86	m^3
			CAPACITY		
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
			MASS		
1 g	0.035 273 962	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 747	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 622 6	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311 3	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 90**	t
			CONCENTRATION		
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	Multiplied by	
1 ounce (troy) per ton (short)	31.103 477	grams per ton (short)
1 gram per ton (short)	0.032 151	ounces (troy) per ton (short)
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

***Note:** Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in co-operation with the Coal Association of Canada.*